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FRIDAY, OCTOBER 6, 1876.

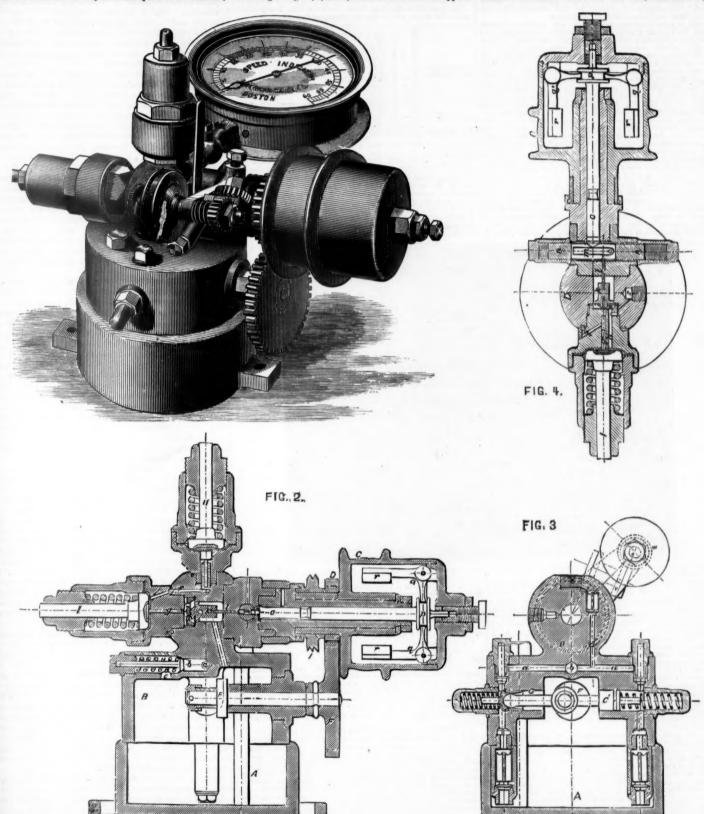
The Westinghouse Train Speed Indicator.

All railway engineers who have been engaged in experiments on brakes or other investigations requiring the speed of a train to be correctly ascertained, have felt the want of a trustworthy indicator which should not only show the speed of the train at

water under pressure by means of a small valve loaded by the action of centrifugal force, the arrangement being such that the higher the speed at which the apparatus is driven, the greater will be the pressure exerted by certain revolving weights upon the escape valve, and the higher therefore the pressure maintained within the chamber with which this valve communicates, this chamber, we may add, constantly receiving a supply of water either from pumps or from the engine boiler. A pressure gauge affixed to the chamber containing the water under pressure, thus affords by its indications information as to the speed at which the apparatus is being driven. Although very simple in principle, however, much ingenuity has been required to bring the apparatus into such a form that its indications shall be trastworthy in practice, as will be seen from the following description of the details of the instrument.

Referring to Figs. 1, 2, and 3, it will be seen that the appara-

as shown in Fig. 2, this valve when open allowing any excess of water to escape through the hole c back into the water chamber A. Communicating with the rassages a a there is a so another channel d, shown in Fig. 3. This passage is fitted with a small check valve as shown, and through it the water delivered from the pumps can flow up to the socket e into which the spring accumulator H is screwed, as shown in Fig. 2. The construction of this accumulator will be readily understood. It consists of an india-rubber diaphragm having on its underside a small plunger against which the water acts, while on its uppr e side is another plunger or piston forced downwards by a spiral spring. The lower plunger has a small rod or needle projecting from it, this needle being very slightly tapered, and the water on leaving the accumulator passing down around this needle to a channel f leading to a second r commulator I. This second accumulator is similar to the first, with the exception



THE WESTINGHOUSE TRAIN SPEED INDICATOR.

entical.
The principle upon which the apparatus acts is very ingeniis and its application to a speed indicator is, so far as we
sow, entirely novel. It consists in controlling the escape of

any given instant, but which should also allow of diagrams being taken recording the fluctuations or diminutions of that speed caused by the application of the brake. It is of such an instrument, designed by Mr. George Westinghouse, Jr.,—the instrument, designed by Mr. George Westinghouse, Jr.,—the whole of the water casting B is fixed a tubular instrument, designed by Mr. George Westinghouse, Jr.,—the whole of the water may be the pulley or casing C, which is driving in the composition of the well-known air-brake bearing his name—of which we now give illustrations.

Mr. Westinghouse's speed indicator is shown by our engraving intended for fixing in a carriage or van, and that shown by high in two forms, that represented by Figs. 1, 2 and 3 being intended for fixing in a carriage or van, and that shown by high a better of the water may thus be considered to be contained at a steady intended for fixing in a carriage or van, and that shown by by the action of the parts. To one side of the casting B is fixed a tubular axis on which is mounted the pulley or casing C, which is driving in the pull-will of the parts. To one side of the casting B is fixed a tubular axis on which is mounted the pulley or casing C, which is driving in the pulley of the water may thus be considered to be contained at a steady intended for fixing in a carriage or van, and that shown by Figs. 1, 2 and 3 being intended for fixing in a carriage or van, and that shown by Figs. 4 being blocks. Fixed to the pulley C is a pinion D which great into a small spur wheel E mounted on a spindle which we shall refer on an engine, the supply intended for fixing in a carriage or van, and that shown by Figs. 4. In this case, the being block of the casting B is fixed a tubular axis on which is action of the pulley C is a pinion D which was pulled to the pulley C is a pinion D which was pulled to the supply of the passage of the casting B is fixed a tubular axis on which is drived as a pinion D which is mounted the pulley C is a pinion D which was pulled to

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h, which is connected by small holes with a recess i covered by a thin india-rubber diaphragm attached to the relief valve k. If the form of this latter valve is, as will be seen, such that when raised from its seat the water flows out through a central opening in the valve into a small chamber, from which it can return through a passage shown in Fig. 2 into the water reservoir A. We have now to describe how the pressure upon the relief valve k is adjusted.

It will be seen from Figs. 2 and 4 that the relief valve k has attached to it a rod l, which takes a bearing against a small horizontal lever m, as shown. This lever is also pressed against at another point by the rod or spindle o, and it will be seen from Fig. 4 that the lever is contained in a recess or mortice cut in a bar n, so that by turning the screwed caps with which the ends of this bar are fitted, the lever can be shifted longitudinally, and the ratio which the pressure exerted by the spindle o shall bear to that transmitted to the rod l can thus be adjusted with great delicacy.

As will be seen from our engravings, the spindle o extends through the tubular axis on which the pulley O is mounted, and its provided within that pulley with the grouved collar p, which takes hold of the shorter arms of the two bell-crank levers q. The other arms of these levers carry small weights r, and it will be seen that as the pulley O revolves, the centringal force developed tends to spread these weights, and thus through the intervention of the bell cranks exerts a pressure longitudinally on the spindle o. But this spindle transmits its pressure through the lever m and rod t to the scape valve k, and thus we see that the pressure with which this valve is loaded depends upon the centrifugal action of the weights r.

The whole action of the apparatus will now be clear. The centrifugal force exerted by the weights r will vary as the square of the velocity at which the pulley O is driven, and hence the pressure on the escape valve k, hence a pressure gauge placed in

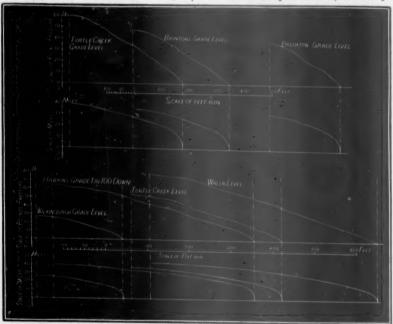
nexed the three in the upper row correspond to stops made on the 26th of June last under the following conditions:

Place where stop was made.	Speed in miles per hour.	Distance run after application of brake.
Turtle Creek (line level)	39 34% 31	412 352 260

The four other diagrams in the third row refer to experiments

Place where stop was made.	Air pressure pounds per aquare inch.	Speed in miles per hour.	Distance run after appli- cation of brakes.	Time making stop.	tano oatio	in miling to beyon of the	he su md po ne brai	bjoined int of ie.	dis-
Wilkinsburgh.	1bs.	263%	ft. 205	sec. not taken	miles. 22	miles.	miles.	miles.	miles
Hawkins Turtle Creek . Walls	85 90 85	40% 87 46%	484 364 550	14 13 15	30 3434 4234	34 2734 38	293 <u>%</u> 19 33	93	179

During these last trials the stop-watch was unfortunately lost off the engine, so that the time is not accurate to a fraction of a second. The performance of the brake during these trials was, as will be seen, admirable; but this is a matter of which we shall speak on another occasion; at present we are dealing with the diagrams before us. As we have already explained, heights in these diagrams represent pressures in the accumulator of the speed indicator, and these pressures again



From the indications of this gauge the speed of the train at any instant can be at once see with the speed of the train at any instant can be at once see with the speed of the train at any given instant, but to be able to take a diagram recording the decrease of speed after the application of a brake, and for this purpose the apparatus we are describing is fitted with attachments for connected at a (see particular to the speed of the train at the speed of the speed of

Contributions.

The Justifiable Expenditure for Improvement in the Alignment of Railways.

BY A. M. WELLINGTON, C. E.

[Copyrighted 1876, by the Railroad Gazette,]

[Continued from Page 428.]

REDUCTION OF RULING OR MAXIMUM GRADE,

A maximum grade causes an increased expense, which depends for its amount on the elevation attained, like all other gradients. This is practically independent of the rate of ascent, and we have already considered it in the previous chapter, under the head of RISE AND FALL. It is that portion gradients. of the expense of gradients which directly and invariably appertains to them, or what we have termed the *inherent* exper of any deviation from a level.

In addition to this the MAXIMUM grade of a line usually has the distinct and far more important effect of increasing either the number or the weight of engines (in other words, the ENGINE TORNAGE, as we shall hereafter term this composite quantity) which is required to transact the business of the road, thus increasing the expense of operating the entire line; and a mile or two of heavy grade will thus limit the weight of trains as effectually as 20 miles. It is this effect of gradients which we propose now to consider. In only one case does the maximum grade fail to have this effect, viz., when the curvature is so sharp and the gradients so low that the curves inter-vene in advance of gradients to limit the weight of trains. This is very rarely the case, but in order that such an effect from curvature may be avoided without needless and wasteful expenditure, the minimum radius permitted should be correctly adjusted to the maximum gradient. This is one of the most important and most neglected subjects connected with the location of railways, and we shall separately consider it before completing this paper. It is often absurdly and arbitrarily

The effect of the highest rate of grade in fixing the engine tonnage is an external or accidental attribute, as we have seen under the head of Rise and Fall, which depends solely on the rate of ascent and not at all on the elevation attained; while exactly the reverse is the case with that inherent and universal expense from gradients which has no limiting effect, but results from all ascent and descent, whatever the rate. For example, let us suppose we have a located line 90 miles long with a maximum grade at all points of the line of 40 feet per mile, except two or three miles of 50 feet grade. Now in deciding upon the location of the latter, a very great expenditure per mile may be justifiably incurred to reduce the rate of the 50 feet grade to 40 feet per mile, and in addition thereto a certain amount of expenditure (and a very moderate amount) may be properly incurred to reduce the length of the grade, i. e., the height of the summit. Let us now suppose that it is subsequently decided to extend the line 10 miles further, and that on this extension the minimum gradient attainable, by any justifiable expenditure, is 52.8 feet per mile. The proper alignment for the original location is now very different, and the original alignment, if at first judiciously located, will re-quire an entire readjustment. All expenditure to reduce the rate per mile of the 50 feet gradient has now ceased to be justifiable—except an inconsiderable fraction which we have preidered under the head of Rise and Fail—and in addition thereto if anything can be saved (beyond the aforesaid inconsiderable fraction) by increasing the rate of the 40 feet grade and other minor gradients up to any rate less than the superior limit of 52.8 feet per mile, it should be done. The justifiable expenditure to reduce the height of the summit, however, or to avoid any other rise and fall, remains unaffected. The latter is the inherent expense of gradients, the former is external and accidental, and the two are wholly distinct and dissimilar, both in their nature and effect.

When the gradients are such that assistant engines may be economically employed, the effect of gradients and their proper adjustment is somewhat different. We shall consider that question hereafter. For the present, we assume that assistant engines are not intended to be used, but that trains are to be run through without change from one end of the line to the other. If trains are broken up at any point of the line, such distance as they are run through without change con stitutes in effect a separate line or division, but the breaking up and recombining of trains at frequent intervals form a very expensive and undesirable necessity which is hardly suscepti-ble of exact estimation, but should always be borne in mind. We shall have occasion to refer again to the subject hereafter when we have more data available.

We have been thus particular, in the above remarks, to define the subject we propose to consider because it is one of real difficulty and of undeniable intricacy, if the results finally obtained are to possess any value. It is not difficult to devise a short cut to an estimate. Several such are known to the writer. But the difficulty with them all, so far as the writer's knowledge extends, is that they are either based on incorrect premises or are otherwise easily capable of a reductio ad absurdum. Hence they will not stand practical tests, and are deservedly consigned to the limbo of forgetfulness in prefer-ence for the rule of thumb. And in the great majority of instances of the thumb of the left hand, for the profound importance of well-adjusted ruling gradients to the financial tuture of any railway, in comparison with the more showy and striking improvements, such as a short line, flat curves and low summits, is hardly appreciated by many of the locating engineers who practically decide the balance between such matters in the field, and, if the seeming egotism may be pardoned, is not thoroughly comprehended and correctly under-stood in detail by many engineers of long experience and of distinguished ability. As to this fact "their works do testify," as we shall have For

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reason the principles underlying the proper and economical adjustment of the alignment of railways has not been deemed worthy of that careful and general analysis which is so freely bestowed on the size of a link pin, and, in the haste of actual practice, the ablest engineers do not seem exempt from unmistakable errors such as might be expected only from those of very limited experience. We now refer more especially to our present subject of the proper adjustment of gradients.

It is hoped to make the discussion of this subject clear and easily followed, and to secure final results in tabular form, similar to those heretofore obtained in these papers, of ready and simple application in practice; but it is not hoped or expected to reach this result quite as readily or simply as heretofore. To estimate correctly the cost of ruling grades, in a form which will answer the practical requirements of location, we must begin from the foundation, and consider, in some detail, the following points:

1st. The power of engines on various grades; that is to say, the load which engines can be depended on to haul up any grade under all ordinary circumstances.—In order that our realts may be general, we shall determine this in the form of a

sults may be general, we shall determine this in the form of a ratio to the tractive power, and for both gross and net loads. 3d. The percentage of change in the net load resulting from any given increase or decrease in the rate of any grade.—We shall find this to vary considerably on different grades but to be nearly uniform per foot of increase or decrease in the rate of any given grade.

Ad. The increase in operating expenses which would result 3d. The increase in operating expenses which would result from such a change in the ruling grade as would double the engine tonnage required to move a given business.—Such a change would be met in practice by an increase both in the number and in the weight of engines; mainly, however, for practical reasons, in the number of engines. We shall therefore estimate the cost of an increase in each separately, and the an average between them. take an average between them.

These problems are merely preliminary to those which follow. After solving them, we shall have all the requisite data

low. After solving them, we shall have all the requisite data for determining,

1st. The following purely abstract quantity, the definition of which, in order to fix it in the memory, the patient reader is requested to read over twice, viz.: The increased coat PEB TRAIN MILE REQUIRED TO MOVE A FIXED TONNAGE ON ANY GIVEN MAXIMUM GRADE, resulting from the addition of any number of feet per mile to the same. In other words, the cost per train of increasing the number of trains required, by increasing the maximum grade. This, it is true, is merely an abstraction, but it affords the simplest basis for a ready and correct comparison of alternate alignments, if not the only one, and it is well adapted for the important and difficult purpose of striking a just balance between the value of reducing grade, saving distance, curvature, etc., and the readjustment of gradients for the use of assistant engines.

the use of assistant engines.

The same values which apply to an increase of maximum grade we shall find to apply also (negatively, of course) to a decrease of grade. crease of grade.

decrease of grade.

2d. The value per loaded oar of reducing the ruling grade—a form of estimation less suitable for comparative purposes, but sometimes more convenient when the value of reducing the ruling grade alone is to be estimated, especially in the case of dready constructed and in operation.

3d. The proper balance of ruling grades for an unequal traffic

in opposite directions.

4th. The correct adjustment of the minimum radius of curvature to the rate of the maximum gradients. The last two subjects form an essential part of any thorough consideration of the subject of gradients, and have been as arbitrarily decided, with as much folly and unreason, and with as serious results to the finances of railway companies, as any others connected with railway location.

5th and lastly. The effect of a difference in ruling grade on the cost of distance, curvature and rise and fall—a subject of occasional importance in attempting a just comparison between alternate alignments which differ considerably in the rate of the ruling grades.

THE POWER OF ENGINES AS AFFECTED BY HIGH BULING GRADES.

The absolute effect of gradients to increase the load on the engine is constant and easily determined. It is equal to the

loads hauled by the same engine on different grades, by eliminating the constant effect of gravity. This is a problem of the sine, and this depends, so far as the gross load is concerned, upon a single variable quantity, viz., the nolling friction in considering the subject of rise and fall; but this value would not be a correct one for our present purpose. In addition to this, there is another variable element which we must determine. The true measure of the cost of gradients is their effect upon the net or paying load of arms and freight, and not upon the gross load; and the effect upon the net load depends upon an additional variable, viz., and the product of two variable elements, vii., the state of the engine and tender to the facts report of the engine. This latter variable again is it effects upon the net load depends upon an additional variable, viz. and the product of two variable elements, vii., the state of the engine. This latter variable again is it effects of the product of two variable elements, vii., the state of the engine and tender to the factor power of engines. This latter variable again is it also for the variable elements, vii., the state of the product of two variable elements, vii., the state of the engine and tender to the factor of the engine. This latter variable again is it also for the engine and tender to the factor power of engines on different grades which shall be independent of the exact weight of the engine and train. From this table (Table XYIL) we can easily determined the proper values for the engine and train. From this table (Table XYIL) we can easily determined the ratio of adhesion.

The Rolling Friction per from the variable elements of these three variables, we shall be independent of the exact weight of the engine and train. From this table (Table XYIL) we can easily determined the ratio of adhesion of the exact weight of the engine and train. From this table (Table XYIL) we can easily determined the ratio of adhesion of the exact weight of the engine and train. Fro

TABLE XV..

Showing the rolling friction, rate of adhesion, etc., deduced from the average experience of various roads, and from estimates of leading engin

NAME OF BOAD.	AUTHORITY.	Where quoted.	Rolling friction.	Ratio of adhes'n	Ratio of tractive power to wt. of eng.	drivers.	Wt. eng. and tender.		Gross loads.	Angle of friction in ft, per mile.
Phila. & Read'g. Lehigh Valley. Eric Railway.	H. J. Lombaert, Vice Pres. Steels. (Av'g's of several reports.) Z. Colburn's experiments. Present daily experience. Charles Ellet.	" " 514 " " 403	8.73 9.1 9.5 7.49	1-4.6 1-4.75 1-5.1 1-5.1 1-5.1 1-6.2	1 to 9.5 1 to 10.8 1 to 11.3 1 to 12. 1 to 8.9 1 to 6.6 1 to 9.52 1 to 6.2	26.5 1P. 40. 20. 37.5 27.5	62.75 43.5 69. 43. 70. 27.5	10 & 96 10 & 52.8 10 & 52.8 Lev. & 100 21 & 133 6 & 60 6 & 60	922 & 282 922 & 402 882 & 382 768 & 154 1,012 & 270 1,765 & 464 1,070 & 430	28 23 24 25 20 13 30 26
U. P. R. R Shen'h Val.R.R.	Estimates of Engineers. B. H. Latrobe, Cons. Eng. Col. Seymour, Chief Eng. Herman Hauptstandard, for purposes of	U. P. R. R. Rep. Van N., May, '71	6.	1-7	1 to 10.8 1 to 11.4 1 to 10.	39.	65.	116 & 200 30 & 53	214 & 136 541 & 380	32 16 24

REMARE.—Eric Railway.—The first line given above is based on the exceptionally isvorable results of Mr. Zerah Colburn's widely-quoted experiments, made many years ago. The second line is based on the present daily practice of the road. With a 76-ton engine (including tender, loaded) the usual train on the Susquehanna Division going east is from 45 to 50 or more cars (taken as 50 cars or 1,000 tons), ruling grade 5 feet per mile. On the Seastern Division, for the same engine, the usual load, up 60-feet grade, is 16 cars. On the Susquehanna Division, however, the curvature intervenes in advance of gradients to limit the weight of trains to some extent; how much the writer has no data for determining, and except for that fact the rolling friction would doubtless be lower, say 9 or 10 lbs. per ton.

Virginia Cestral Railroad.—The results given are for very steep grades (296 feet per mile) operated with tank engines, consequently the ratio of tractive power to weight of engine and tender far exceeds any other in the fable, except Zerah Colburn's, above referred to.

Pennsyleanda Railroad.—The statistics on which the above results are based were given to Mr. Herman Haupt for this especial purpose, as a basis for his calculations for the gradients of the Shenandesh Valley Extension Railroad.

Union Pacific Railroad.—Col. Seymour's estimate was confessedly based, in his reports, on the exceptional results of Mr. Zerah Colburn on the Eric Railway.

Letigh Valley Railroad.—Col. Moreover, the statistics given were mainly as to what special engines had done and not what they habitually do. A lower rolling friction therefor was to be expected.

TABLE XVI.,

Showing the Ratio of Weight in Drivers to Total weight of Engine and Tender for Various Patterns of Engines.

STYLE OF ENGINE.		ght of Eng of 2,000			ght of Ter of 2,000		Grand	Ratio of a	weight of
	On drivers.	On truck.	Total.	Tender empty.	Load.	Total.	total.	Tender loaded.	Tender empty.
Baldwin "Standard American". Penna R. B. Standard Passenger. "Freight. "Mogul" Engine, 2-wheet truck. "Consolidation "Engine, 2-wheet truck.	21. 19.5 24. 30.5 29.	11.5 12.05 10.25 4.5 9.5 5.	32.5 31.55 34.25 35. 38.5 45.	10. 9.87 9.87 9.5 10.	11. 13.5 13.5 10.5 12.	21. 23.37 23.37 20. 22. 24.	58,5 55,12 57,62 55, 60,5 69,	0.393 0.353 0.418 0.554 0.480 0.580	0.494 0.470 0.542 0.886 0.600 0.726
"Mogul" Erie Railway 2 " " P. B. & W. R. B., 4-wheel truck	37.5 30.	7.	45. 44.5 40.			26.7	71.2	0.526 0.500	****

werage rolling friction would be much less, say 6 to 8 lbs. per

To estimate the cost of high grades, however, the average rolling friction is not a proper standard, as previously stated, and a neglect of this fact has led to great overestimates of the value of reducing high grades. The rolling friction for this purpose should be determined, not from the load which an enpurpose should be determined, not from the load which an en-gine can haul under favorable or even average conditions, but from the load which it actually does haul, day after day, over the roughest parts of the track and in all but extraordinarily bad weather. For example, we will suppose that an engine set-ting out for a run over a perfectly level road could haul withting out for a run over a perfectly level road could had with-out difficulty 80 cars at a slow speed, and might hall 90 except on a short section of bad track. The average resistance over the whole line would then correspond to a load of say 88 cars, but even 80 cars would be an excessive measure of the capacity of the engine by which to estimate the effect of high grades; for as a matter of every day practice, an engine is always loaded so lightly as to be "well in hand" for such contingencies as a so lightly as to be "well in hand" for such contingencies as a slippery track and a higher speed to make up time at the points of greatest resistance, and the ordinary train over such a line for an engine which might haul 80 cars under favorable conditions would probably be about 60 cars more or less. Hence, the rolling friction corresponding to that load is the proper (because it is the actual) measure of the cost of higher grades. It is plain that to exaggerate the load which engines would haul, as a matter of every day practice, except for gradients, is to unduly exaggerate the cost of the gradients themselves.

selves. The rolling friction to be assumed (and also the ratio of adhesion) can be most properly determined from the habitual loads hauled by the same engine on different grades, by eliminating the constant effect of gravity. This is a problem of the simplest description, as follows:

Having given the gross loads, L and L', habitually hauled by the same engine up two different grades, g and g', required to determine the rolling friction and also the ratio of adhesion,

but it is deemed proper to carefully avoid an over-estimate, as heretofore. Mr. Benj. H. Latrobe, in adjusting the very high gradients of the Portland & Ogdensburg Railroad, considered a rolling friction of 12 lbs. per ton as the lowest rolling friction which could properly be assumed, and this is doubtless no higher than is occasionally encountered; but, with deference to Mr. Latrobe's high authority, it appears to be higher than the rolling friction which is practically assumed in fixing the habitual load of engines, and therefore excessive. Occasionally on all railways trains will get stalled which are able to overcome a rolling friction of 10 lbs. per ton, but if experience has shown it to be uneconomical to limit the weight of trains to a higher rolling friction offer construction, it is had practice for come a rolling friction of 10 lbs. per ton, but if experience has shown it to be uneconomical to limit the weight of trains to a higher rolling friction after construction, it is had practice for the engineer to assume a higher standard for the adjustment of his gradients—although it is far worse practice to assume a lower one. A distinguished example of the latter error is an estimate made for the Union Pacific Railroad by Col. Silas Seymour, the Consulting Engineer of the road, to determine the advantage of adopting a longer line and lower grade near Omaha. As a basis for this estimate, Colonel Seymour assumed a rolling friction of only 6 lbs. per ton, confessedly based on Colburn's Experiments on the Eric Railway, which were for the purpose of determining the maximum power of engines under very favorable conditions. The every day practice of the Eric Railway would have given nearly double this rolling friction. Under this assumption, the apparent value of the longer line and lower grade is just double what would be given by the assumption deemed proper by Mr. Latrobe. It is perhaps an unkind suggestion that Colonel Seymour was at that time engaged in proving to a board of government engineers that the longer line was greatly to the advantage of the company independent of the government substitute government originates that the solution of the government sub-sidy of \$16,000 per mile. We shall hereafter endeavor to deter-mine the true difference in value of these alternate alignments,

and on the narrow gauge of

12.47 pounds per ton on curve of 300 ft. radius and straight line.

You will note on the enclosed report of experiments made on
the Eric road in 1854, on the 6-feet gauge, that Mr. Colburn

5.84 pounds per ton on a 1° curve or 5.730 ft, radius.
9.94 " " " 3½° " 1,637 " "
10.50 " " " 3½° " 1,146 " "
11.08 " " " 5° " 1,146 " "

Mr. Colburn's calculations take account of the additional

engine friction, partly due to the grade, and are probably more accurate than the above method of taking the aggregate.

I believe it would have been proper to include the 347 lbs. of engine friction in the calculations, which weuld increase the co-efficient of friction from ½ to 1 pound, but still leave it much

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Published Every Saturday. S. WRIGHT DUNNING AND M. N. FORNEY.

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Editorial Announcements.

auss...All persons connected with this paper are forbidden ask for passes under any circumstances, and we will be tha ful to have any act of the kind reported to this office.

ddresses.—Business letters should be addressed and drafts made payable to THE RAILBOAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILBOAD GAZETTE.

dvertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, ENGET IN THE ADVENTISHO COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and is our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers on do so july in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

entributions.—Subscribers and others will materially assist us in making our news accounts and complete if they will send us early information of events which take place under their observation, such as changes in ratiroad afficers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of ratiroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of ratiroad business by men practically acquainted with them are especially desired. Officers will oblic us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

SETTLING THE RAILROAD WAR.

A restoration of through rates was rumored last week as likely to result from a conference of Baltimore & Ohio. Pennsylvania and Erie managers in New York. It is possible enough that the conference was intended to hasten the "settlement" of the pending defliculty; but it must have been somewhat such a "settlement" as might have been aimed at by a conference between Generals Lee, Longstreet, Jackson and Stuart in the face of the Federal army; that is, it was a conference of allies and not of antagonists, and as the New York Central & Hudson River, which in this case is probably regarded as the non enemy, was not present and was not even invited, we may infer that it was not a treaty of peace nor even an armistice that was aimed at, but rather the development of a policy, which may be a plan of campaign, or the settlement of the basis on which peace will be acceptable to all the parties on their side of the contest a matter worth considering as the close of navigation

approaches and with it the season when east-bound rates at least are almost always advanced, and when, probably enough, it will become really necessary to advance them to prevent the choking of the roads. Meanwhile Mr. Wm. H. Vanderbilt is reported as saying that "when the other roads are willing to consent that the freight rates from the West should be the same to New York as to Baltimore and Philadelphia, the New York Central will be ready to make an agreement as to the rates, but not sooner." This is anything but encouraging as to a settlement of the troubles, for this basis will be looked upon by the Baltimore & Ohio at least as a practical abandonment of the grain export business by its road—a business which has attained immense proportions within two years past, and has been maintained throughout the season of reduced rates. The fact (if it be a fact) that the New York Central can carry to New York as cheaply as the Baltimore & Ohio can to Baltimore will make no difference to the last-named What it wants is some profit on a share of the export traffic, not necessarily as great or half as great a profit as the New York Central is able to make on similar business. And it will not cease to work for a share of this business, and for as much as it can get, so long as there is any profit to be got from it. If the New York Central's expenses can be reduced so low on its through traffic that what is the bare cost on its rivals'

lines will yield it a profit, then it can maintain its position under almost any conceivable circumstances; b the rate which it maintains leaves any margin for profit to the Pennsylvania and the Baltimore & Ohio, they will certainly carry a share of the traffic though they should be bankrupted a score of times. The only way to maintain rates on a basis more favorable to New York than to Philadelphia and Baltimore (whatever that may be) and yet profitable to the carrier to New York, is first to bankrupt and then to buy the Philadelphia and Baltimore railroads. Bankrupting alone will not do. Bankruptcy does not destroy a railroad, it only changes its ownerssubstitutes for those who expected a large income from the property proprietors who are satisfied with a smaller And just so long as any profit is left on a business, the new owners of the railroad will surely try to get such husiness

It may be contended, however, that equal rates to the three ports in question will not be such a discrimination in favor of New York as will destroy or greatly reduce the export traffic of Philadelphia and Baltimore. If so, the New York Central's position is sound. The same arguments which prevent the more southern roads from giving up their traffic to Baltimore and Philadelphia will induce the New York Central to oppose any policy that will result in a diversion of business from New York, and if it cannot keep the traffic otherwise we may be sure that it will maintain rates as low as those to the other ports, and even lower, unless such rates leave it absolutely without profit in the long run. And the developments of the past year give good reason to question whether such a discrimina-tion as has heretofore been made and conceded is necessary to enable Baltimore and Philadelphia and the carriers those places to secure a large share of the export traffic. Formerly their business had to be encouraged; now it is well developed and estab-And the differences heretofore maintained were really very large-larger than appeared from the tariffs: for in addition to the five cents per hundred in the regular freight rate the railroad companies gave a drawback of five cents per hundred on all grain exported from the southern ports, making altogether a difference of twenty dollars per car-load in their favor as against New York. A few months ago the drawback on exports was reduced to one-half, and a little earlier the difference in rates was changed from an arbitrary five cents per hundree to a percentage which would be but five cents in favor of Baltimore when the grain rate is 40 cents to New York, and but 2½ cents when the rate is but 20 cents, as during the past five months. Even at current rates, however, there is a difference of five cents a hundred, or 2.8 cents per bushel on corn, in favor of shipments to Baltimore, and of 21 cents per bushel in favor of Philadelphia shipments as compared with New York. These differences amount to \$9 and \$10 per car-load, and have been sufficient (if they alone have determined the course of shipments) to attract enormous quantities of grain to the ports so favored.

If the effort to maintain equal rates to these three ports should fail, it is still questionable whether the basis agreed upon last winter, that is rates just in proportion to distance, however high (or low) these rates may be, can be maintained. We have seen that this season, when this proportion amounted to but four and five dollars per carload (in addition to the export drawback of five dollars) the Philadelphia and Baltimore receipts have been enormous, and the corn exports of each larger than those from New York. Now it is reasonable to suppose that with the common winter rate of 40 cents per hundred the additional difference of four and five dollars per car-load would still further divert traffic from New York. Grain merchants are nearly as anxious to save five dollars on a bill for \$80 as on one for \$40, and no basis of rates is likely to be permanent which induces a different distribution of traffic when rates are high from that which prevails when rates are low; which causes New York to receive most of the rail grain in summer and almost destroys its grain trade in the winter.

It is not reasonable to expect that rates can be settled on a permanent bases now, whatever the disposition of the railroad managers may be. There is reason to believe, as we have seen, that the basis heretofore prevailing work against New York under the existing circumstances. But we cannot say what would be an equitable basis without experiments. The practicability of any proposed system can only be proved by practice. No company will adhere to a basis which destroys its business, however favorable it may have thought it and however warmly urged it when it was first proposed. But one obstacle to an agreement meets us on the threshold: What will be considered an equitable division of traffic? If each of three companies insists that its favorite port should get one-half of the traffic, it is of little use to talk of a basis of rates, for whatever might be adopted, the result would inevitably be unacceptable to one and probably to two and even to all of the parties to it. Before the managers attempt to make such a tariff as will give each port its "fair share" of traffic, they should come to some understanding as to the railroads have been built, not because there was too much proportion which shall be considered a "fair share."

The Coal Roads

Philadelphia & Reading stock, which was held up firmly at 44 (\$50 shares)—that is with next to no depression—for three weeks after the first coal auction which brought down with a run the other coal stocks, broke finally last week and seems to have fallen faster and further in proportion to the firmness with which the price was m tained. This week the price has been as low as 20, the fall in about a week having been about 55 per cent. It is reported that the early firmness of the stock was due to the support given by capitalists, and especially by the English bankers of the company, and that the final collapse was due to the fact that investors—those in America at least-were ready to let their entire holdings go at 44. The company was the first of the coal-carriers to pass a dividend, and thus seemed to prepare early for the coming storm; but this had but little effect on the price of the stock, the public having great confidence in the management, which confidence seemed confirmed by what appeared to be conservative action. The stock of the company is more than \$34,000,000, and the recent fall in price takes more than \$16,000,000 from its current market value. Much of the stock, we believe, is held in England, but a great deal is owned in this country, a 10 per cent. stock which could be had for about 110 (as it could be while it was paying dividends) being very attractive to investors who wish to receive a large income from a small capital.

Generally the coal-carriers' securities have fallen within week, though the recent auction sales showed an improvement in the price of coal in spite of the large quantities offered. Investors remember that the coal companies have been insisting that they could not afford to mine and carry coal at much less than the combination prices, and now that the ruling rates are a dollar and a half lower they conclude that the margin for profit must have vanished quite. They have also been led to examine the capital accounts of the coal-carriers, and they find them enormous, requiring a very large profit from coal to keep the the companies solvent. It is true that these capital accounts may easily be misleading, for they cover, besides the railroad properties—of whose value some idea can be formed-also enormous coal-land and coal-mine properties, about which it is very difficult to know anything positively. A thousand miles of a railroad which has had for a series of years a known amount of traffic, one can estimate to be worth so much: a thousand acres of coal lands may be worth much, and may be worth no more than Col. Mulberry Sellers' estate in the "knobs of Tennessee." For the coal companies' reports do not inform us how much coal has been raised at their mines, at what expense, and for how long a time. There is an impression that the companies have bought a great deal more coal than they can use; and considering the in which the business has been conducted, it is evident that, aside from investments in unopened coal lands, there must have been an excessive investment in mines actually worked, and probably a large waste in working them. For nearly the entire yearly supply of anthracite is sometimes raised within six months (owing to strikes). A corrollary of this fact is that the mines worked are nearly twice as numerous as they need be; that an enormous capital has been sunk in opening and providing with machinery these superfluous mines, and more is being wasted constantly in keeping them pumped out and in working order; while the greatest waste of all, perhaps, is in maintaining an army of workmen to labor six or seven months in the year. Indeed, the difficulty with the miners is sufficient to explain nearly every other difficulty. It being a fact, verified by years of experience, that the miners would be idle nearly half of the time, the only way in which the demand could be supplied was by developing double the mine capacity that would be required if operations could be carried on regularly throughout the year. And it is not necessary to assume that the people engaged in coalmining and carrying were either fools or rogues because they did what they have done-that is, provided means for supplying the demand for coal under the actually exist-Doubtless they have done some ing circumstances. thing more than this; and have provided for a larger production, even with the demoralized labor, than could be disposed of in the most prosperous times; but they had no alternative (assuming, as we may, that they could not induce the men to work twelve months in the year) but to develop such a coal-producing capacity as, worked all the year round, should glut all the markets and force prices down below the amount needed to pay interest on the capital actually invested.

The coal-carriers which had no outlets of their own to the sea-board have also had to meet a temptation which some of them have not been able to resist, due to the very large traffic which they could absolutely comm and the remunerative rates for coal-carrying maintained for many years. That is, such an interior carrying com-pany was loath to yield its coal to another company to carry to the sea-board, inasmuch as its own business would return a good meome on the cost of a new road. Thus business for the capacity of those previously existing, but 876

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because there seemed to be enough to yield good profits on the cost of an additional one. The truly economical policy, of course, would have been to concentrate all the traffic possible on a single line, and thus save paying interest on the cost of a second one. However, the coal mpanies are by no means the first to build superfluous railroads. That has been one of the commonest of errors throughout the country, and the only peculiarity of the coal companies is that they are later than others in meet

The Grain Movement for Twenty-two Weeks.

The shipments of grain of all kinds from the eight principal Northwestern markets for each week since April 22 have been, in bushels, by lake and by rail:

107.00	k ending-	By lake.	By rail.	Total.	Per ot. by rail.
	29	1,634,541	2,072,946	3,707,487	56
May	8	2,445,191	2,292,633	4,737,824	483%
Many	13	1,538,526	2,302,940	3,841,466	60
46	20	1,602,170	2,016,304	3,618,474	55%
66	27		1,820,456	3,567,864	51
June	3		1,797,922	4,210,084	4236
44	10		2,147,670	5,042,585	
86	17		2,391,811	5,313,216	
44	24		2,198,054	4.926,760	
July	1		1,784,548	3,605,708	
outy	8		1,205,184	2,970,194	
44	15		1.228,678	2,877,186	
46	22		1,032,825	3,302,161	
66	20		1,038,208	2,504,710	
Aug.	5		1,283,268	3,338,511	
Aug.	12		1,300,720	3,044,779	
46	19		1,614,256	3,764,548	
86	26		1,520,811	3,872,963	
			1,573,058	3,271,549	
Sept.	9		1,818,411	4,192,884	
66	16		1,688,318	4,651,952	
44	23		1,820,361	4,089,250	
Total	for 22 weeks	46,502,773	37,949,382	84,452,150	45

The shipments are smaller than for the two previous weeks yet are still large. The loss is wholly in the lake grain, rail shipments being the largest since June.

For the same 22 weeks the receipts at the different Atlantic

form many mount	Den comb	n.	r cent.
Corn.	Per cent. of total.	All grains. o	
New York	31.8	37,017,195	44.1
Boston 4,886,203	10.8	6,519,230	7.8
Portland 431,800	1.0	781,770	0.9
Montreal 2,550,874	5.7	9,146,963	10.9
Philadelphia	24.5	15,832,600	18.8
Baltimore	22.4	12,385,185	14.7
New Orleans 1,691,021	3.8	2,315,637	2.8
Total	100.0	83,998,580	100.0

New York continues to improve its position as a corn re-ceiver, and during the last week it also advanced a little in total grain receipts, contrary to its course for some weeks previous. Baltimore and Philadelphia fall back a little in rank as corn receivers, but in receipts of all grains Philadelphia holds its position and Baltimore falls back but a little.

During the last week, the percentage of the total receipts of corn at each principal port was: New York, 47½ per cent; Philadelphia, 16½; Baltimore, 13½; Boston, 9¾; Montreal, 8½. In grains of all kinds, these percentages were: New York, 48 per cent.; Philadelphia, 20½; Baltimore, 11½; Montreal,

treal, 8½; Boston, 8 per cent.

Corn continues to form by far the largest part of the receipt at the seaboard. For the last week it was 57 per cent. of the whole. But wheat at last is beginning to come forward from the Northwest, and for the last week the lake ports' shipment included a little more wheat than corn. For the whole season since navigation opened, 53% per cent. of all the grain re since havingston opened, 30% per cent. of an integral re-ceived at the seaboard has been corn. For two months and more, however, the proportion of corn has been 59 per cent. For the part of the calendar year ending Sept. 23, corn has formed about 56 per cent. of the total seaboard grain receipts the proportion as well as the absolute quantity being unex —the proportion as well as the absolute quantity being mex-ampled. It cannot be expected that this proportion should continue through the fall months. The last year's crop is usually pretty well marketed by this time, while the new one will not come forward for some months. With wheat the chief grain, probably New York will take higher rank among the grain receivers.

The Men Who "Know it All."

There seems to be something about the occupation of a rail-road man which intensifies personal character. We have seen arbitrary men grow more dogmatic and inflexible year by year, and meek men who became more plastic the longer they were subject to authority, prompt men who grew to be as imperious as Napoleon, exact men whose methods ultimately would have done credit to scientific research, lazy men who by practice learned constantly how to do less, industrious men whose in tentions were stronger than their power of fulfillment and who ultimately succumbed in health and strength, visionary men who dreamed fresh dreams and more of them month by month, conservative men who shrunk from season to season with a sor conservative men who shrunk from season to season with a sort of envelope of unimpressibility like a caterpillar into its cocoon (leaving us akeptics, however, whether they would ever emerge butterfly fashion), sanguine men for whom the future was always drawing compound interest on the past, honest men whose scruples grew more strict as their lives lengthened, dishonest men who received more and bigger bribes as they grew older, wise men who learned wisdom with their experience, profane men who swore oftener and more interesting the locars they were complexed on reallyzed. experience, profane men who swore oftener and more irreverently the longer they were employed on railroads, ignorant men whose minds seemed to grow more dense the longer they fulfilled the duties of their calling, and conceited men whose knowledge and wisdom in their own estimation far surpassed that of all the philosophers and sages. It is this latter class to which we wish to give a little attention—the class whose conceit coupled with dense ignorance obstructs all the avenues which lead to improvement, and who, if they could, would snuff out all the lights of knowledge excepting their own prescience, and make bonfires of libraries and barbecues

of philosophers. So self-satisfied are they in their own conceit or philosophers. So self-satisfied are they in their own concert that a suspicion of their own ignorance never dawns on them; but, to employ a common phrase, "they think they know it all." There is something exceedingly hopeless about this state of mind. You talk to such men about the advantages of the improved form of rail sections with comparatively thin web or stem, and they will say "I don't like it," as if their likes the improved form of rail sections with comparatively thin web or stem, and they will say "I don't like it," as if their likes and dislikes were the final court of appeal in such matters. So wrapped up are they in their own opinions that they do not seem able to conceive that there may be reasons and causes which determine what is right or wrong, good or bad, quite distinct and separate from their own self-consciousness. If you gently ask for reasons for their faith or rather prejudice against the form of rail, they may venture the guess that the web is too weak and that the rail will bend over. If you demur and say that many miles of such rails are in use and no such trouble has been experienced, or if you refer him to experiments which have been made with rails having much thinner webs and show him that these were still stronger than the resistance of the spikes, and that before the web would bend or break the spikes could be drawn out, he will tell you that such may be the case in theory, but in practice it is different. At this stage of the argument the man who "knows it all" will usually not hesitate to say what is not true in order to defend his own position, and will tell you that he has seen plenty of such rails which had given way laterally, and that at any rate if they do not do so they will, and even if they don't they are too weak in the head and will splinter off on the side. You mildly suggest that while this may have been the case with some of the first forms of such rails, the heads of which were not deep enough, but were made very convex on which were not deep enough, but were made very convex on the side, so that with iron imperfectly welded such rails did splinter off, but that with more recent forms the heads of which were deeper and flat on the sides and the rails made of better material instead of bad iron, no such difficulty existed. better material instead of bad iron, no such difficulty existed. He will then probably lead you to a pile of old rails, and show you triumphantly specimens of just such rails as you have described made of the poorest iron and torn into shreds by hard usage. "There," he says, "are your new-fangled rails." "There," you say, "are the old and imperfect forms made of bad material." "They have done just what I said they would," he says, while you protest that they are not a good pattern or good material; and he ends as he began by a proclamation that he "don't like 'em."

If you talk about locomotives and suggest that their provement in economy of fuel and performance generally has not kept pace with the improvements which have been made not kept pace with the improvements which have been made in marine and other engines, he will quite likely say that the reason is because railroad companies will not use his patent grease pot. "You see it takes too much power to overcome the friction. Things is not lubricated right, but my grease pot just puts the oil where it is needed and saves all that is not needed." If inclined to be argumentative and at the same time conciliatory, you may say to him that probably his grease pot is a good thing, but that you think there are other source of waste, such as loss of heat by radiation, the use of wet steam and impure water, and imperfect combustion, whose aggregate amount is greater than that which could be saved aggregate amount is greater than that which could be saved by greasing properly. It might also be suggested to him that a great deal might be saved by keeping an accurate account of fuel consumed by each engine, thus enforcing greater care and economy in the management of engines. Now to such suggestions the man who knows it all is quite invulnerable. He don't believe it pays to keep an army of clerks to keep accounts of the fuel used; "besides, what is the use? it must be paid for just the same whether you keep an account or not, and it is just as well to save the you keep an account of not, and it is just as went to save the money it costs for clerk hire. As for locomotives, you can't teach him nothing; he knows about them practically; he has run engines and knows what they can do. Theories are all nonsense; he can tell what a locomotive will do without any of your theories."

If you talk about signals, he will ridicule all the recent in If you talk about signals, he will ridicule all the recent improvements, and tell you that the interlocking system of switches is too complicated for practical use, and costs more than it comes to, and the block system is all a humbug. "If a man hasn't sense enough to keep out of the way of other trains, it is better to discharge him and get good men who know what they are about. This signal business, any way, is all a humbug. Them Englishmen better come over here and learn how to run a railroad, instead of talking to use about their dam signals." us about their dam signals."

The man "who knows it all" has an unlimited amount of The man "who knows it all", has an unlimited amount of such talk. His chief characteristics seem to be a contempt for what other people know, and a very exaggerated idea of the value and correctness of what he knows himself. It is quite difficult for any one engaged all his life in learning, to realize the true state of the mind of the man "who knows it all." realize the true state of the mind of the man "who knows it all."
Such men are seldom entirely stupid. They have a sort of aptness to learn from what they see but unfortunately they seem incapable of realizing that other people have also been seeing and learning as well as they. Then too it is probable that such persons are deficient in imagination. They cannot conceive of the existence of knowledge of which they are ignorant. They seem to feel about it as children do about the question whether the fall of a tree in a wilderness with no one within hearing distance produces any sound, so our knowing friend does not distance produces any sound, so a knowledge which he does not seem capable of conceiving of knowledge which he does not know, and in this way what he learns he comes to regard somewhat as though he were the origina linventor or discoverer of it. He reasons in this way: "If I know a thing, it is true; what I do not know is all humbug.'

one of the causes which produce this condition of mind is the fact that such persons usually acquire information only by personal observation. They seldom are reading men or accus-tomed to accept information on the testimony of others, and this fact implies a certain amount of incredulity. It is true that we all acquire more or less of this with experi-

ence and age, but these who seek knowledge and are always loyal to the truth acquire with experience more or less discernment, which enables them to distinguish true testimony from that which is false, and therefore the effect is to lead them to read and to hear more testimony rather than less, in order that they may find more grains of real value, although they may be, as we all are, obliged to reject vast quantities of chaff. The man who "knows it all" finds it much easier to make a sweeping generalization and declare all other knowledge than his own felly, and is more content in the contemplation of his own wisdo

There is but little hope for a person who has reached mature life with the conviction that he "knows it all." Early education usually is a cure or preventive, but nothing but a sentence to hard labor for the rest of his days will save society from the ills which the man who "knows it all" can inflict on those compelled to come under his influence.

compensed to come under his numerice.

He is especially dangerous in positions of authority, because if he happens to be wrong there is no hope of his getting right, and the blunders of any one with power to enforce obedience are multiplied in proportion to the number of those who are mpelled to obey.

It may be set down as a good rule in appointing officers or railroads or elsewhere to ask first whether he "knows it all." railroads or elsewhere to ask first whether he "knows it all." If he does, reject him, because a man's capacity and willingness to learn form a very important qualification to enable him to command wisely, and no one man ever knows or can know so much as not to be obliged constantly to learn more. A good question to ask about a candidate for a position of responsibility is, What capacity has he for acquiring knowledge? because if he thinks he knows it all, he will gradually become less instead of more efficient and useful as he grows older.

Record of New Railroad Construction.

This number of the Railroad Gazette has information of the

This number of the Rauroaa trazene has information of the laying of track on new railroads as follows:

Ohio Central.—This road (late the Atlantic & Lake Erie) has been extended from Bremen north 11 miles to Pleasantville, O-Dayton & Southeastern.—The first track is laid from Xenia,

O., east to Jamestown, 11 miles. It is of 3-ft. gauge.

Grayville & Mattoon... The first track is laid from Olney, Ill., orthward to Newton, 20 miles.

Burlington & Southwestern.—Completed by laying track from

a point six miles south of Unionville, Mo., south to Browning,

Joplin & Girard.—The first track is laid from Girard, Kan... ast 10 miles.

This is a total of 78 miles of new railroad, making 1,677 miles

completed in the United States in 1876, against 894 miles reported for the corresponding period in 1875; 1,101 in 1874, 2,778 in 1873 and 4,970 in 1872.

A LOCOMOTIVE MAN-CATCHER is advertised for by the Russian A Locomotive Man-catcher is advertised for by the Russian Government—something which will gently pick up the way-farer walking on the track and deposit him in an uncrushed condition out of the way of the train. It will be, we suppose a development from the American cow-catcher, though the development must go a great way. The cow-catcher is a reasonably efficient contrivance for securing safety to the train, but the safety of the cow seems not to have been much regarded by its designers. These animals (and larger and smaller ones, including men) are usually removed from the track by the cowby its designers. These animals (and larger and smaller ones, including men) are usually removed from the track by the cowcatcher, but generally in a mutilated or disabled condition, valuable practically only as a basis of suits for damages against railroad companies; and often more valuable thus than they ever were or could have been, had they never made the acquain-tance of the cow-catcher. It will be interesting to know what kinds of devices will be offered to the Russian Government. We have in mind a considerable class of inventive geniuses on this side of the Atlantic, who, we think, would take great delight in devising apparatus to meet the requirements, and receive the roubles, of the Russian Railroad Administration. We even imagine that we can already see their claims filed in the Patent Office: "I claim the air cushions, and the flexible fingers, and the jointed levers, and the inclined planes, and the feather-bed, and the combination of the air crahions, flexible feather-bed, and the combination of the air cranions, nexible fingers, jointed levers, inclined planes and feather-bed, substantially as set forth." Next we suppose that we will have application for the invention of an apparatus to remove soldiers from the path of a cannon ball, "without serious injury." However, our own columns bear witness to the fact that However, our own comms bear witness to the fact that animals, and sometimes persons, are thrown from the track by the cow-catcher occasionally without serious injury, even with trains running at a considerable speed. The stories are always told as marvels, however, and we believe that no where yet is it safe to neglect the injunction to "" k out for the locomotive hen the bell rings."

SIX MILLION DOLLARS A MILE, according to a Chicago paper, represents the average investment on American railroads, and it urges that these railroads should "receive a fair return" on this investment. Alas I for the people, if they must pay interest on such an amount: it would require an average contribution of more than \$500 for every man, woman and child in the country to pay even 5 per cent. on such a capital.

Contributions

Steel as a Material for Wheels.

To the Editor of the Railboad Gazette:

A very few solid steel wheels are shown at the Centennial, part of them being among Krupp's goods. Several broken pieces are exhibited which reveal both the character of the metal and the exact thickness of the plate. One of these wheels, about 36 in. in diameter, is not materially lighter than our best cast-iron wheels in actual thickness of metal, although the curved outline of it is somewhat different.

It appears extremely probable that our own next important ad-

vance in wheel-making will be in this very direction, viz.: the introduction of solid steel wheels. The developments of the last five years in the art of making tough steel castings to exact pattern have been so great and so favorable, that at the present pattern have been so great and so favorable, that at the present moment but little more than the high cost of production really stands in the way of the use in the body of the wheel of the solid steel itself. It is more than likely, however, that with the continued help of the Siemens furnace for melting, and with a little more judicious competition, the price of such steel castings will be reduced to the point at which they can begin to compete with the best cast-iron wheels.

It is quite certain also that some change in the outline of the wheel plate can be made to great advantage when the use of this material, possessing as it does a high tensile strength, be-comes fully understood, in castings of this form and general character. Just how far the high temperature at which it must be cast, and from which the metal must harden and be must be cast, and from which the metal must harden and be partly cooled in the wheel mould, will be troublesome, is one of the questions which time and trial alone will determine. It is certain, however, that no insuperable difficulties will be found, and, probably, with all the accumulated experience in cast-iron wheels, they will be less by far than those through which our wheel-makers have already passed.

The growing tendency to favor the use of wheels furnished with the property relief the desired which is in property.

with separate rolled steel tires—a practice which is in every respect to be commended—simplifies materially the task of adapting steel, cast to exact pattern, to service in wheels. Experience seems to show that when all the chances of imper-Experience seems to show that when all the chances of imper-fect manufacture and of inferior material are considered, the use of a steel tire gives a more durable wearing surface than can be obtained in any other way; or that if the use of a separate tire be conceded, then the problem becomes quite a simple one. It is certain that in steel of the right quality a hub of considerably less weight than is common in cast iron will resist perfectly the stress due to the pressure by which it is forced on to the axle, and that there will be also an ample margin of rigidity to resist any tendency to stretch and become loose on the axle, by any vibration to which it may be subject. seems also certain that a plate, or body of wheel, of upon the axie, by any vibration to which it may be subject.

It seems also certain that a plate, or body of wheel, of
15 per cent. less weight, if not 25, than the common iron
wheel, will be found sufficient for the purpose; for the tire not
only possesses in itself all the strength it needs but it has something to spare to contribute in a certain sense to the gensomething to spare to contribute in a certain sense to the general strength of the wheel. Just how far, however, this surplus in the tire can be made available in behalf of the rest of the wheel will depend wholly upon the method of holding the tire in place on the wheel, and this need not be here discussed. It is certain, however, that the body of the wheel has only itself is certain, nowever, that the body of the wheel has only itself to look out for, on the general score of strength and stiffness; and a knowledge of just what is needed, in this respect, will be arrived at rather by an attentive study of the light wrought-iron wheels and of the wooden wheels which, in various ways, have been used upon railroads, than by any comparison with existing patterns of cast-iron wheels.

sideration is also in favor of the use of lighter steel This consideration is also in favor of the use of lighter steel wheels, that the conviction is deepening in the minds of our railroad men that it is imperative that weight should be saved in all our rolling stock, especially in those parts that lie below the springs. While the way is hardly clear yet to a reduction in the weight of the axles, since size of journal is an all important element in them, yet the wheel question is much nearer an actual solution, and should be pushed with vigor by those introvested.

those interested.

One other consideration bearing upon this subject may be named, that the judgment of all designers of rolling stock is in favor of a decidedly less weight upon each pair of wheels, the sleeping car and parlor car business having been sadly overdone in this particular. It is obvious that with each reduction in the standard of weight that must be carried upon each wheel, a somewhat corresponding reduction may be made, and ought to be made, in the weight of the wheel itself, and this requirement in every way favors the use of the solid steel as a wheel-making material.

requirement in every way favors the use of the solid steel as a wheel-making material.

Whether solid steel driving-wheels will come into use in our locomotives, rather than the light but very costly wrought-iron wheels so universally used abroad, is a question involving some additional difficulties. No one can doubt our ability to make the wrought-iron wheels as cheaply as any one can, but, fortunately, in the past at least, we have had by no means the same need to use wrought iron in these wheels that foreign designers have been subject to. Our strong cast iron has stood us in good stead here, as well as in other locomotive details, and we have almost invariably adhered to its use. tails, and we have almost invariably adhered to its use.

The advance of steel as a structural material renders it

doubtful whether the possession of so admirable a thing as our strong cast iron should be called always, or much longer, a fortunate thing, since it may very easily come to block the way to a more rigid and exhaustive study of the conditions of many de-tails of construction, and so really prohibit the use of the better material. There is even more reason to believe that solid steel driving-wheels will come into use, displacing the cast-iron wheel without permitting the farther use or trial of wrought iron for this purpose, than there was years ago for believing that the straight axle and the outside cylinder would ever so completely displace the crank axle and the inside cylinder, t the pretence, in this country, of using steel for the English engineers obviated the breakage of cranks by putting in steel, while our own stepped over the crank entirely, and ousted it altogether from our locomotives, as well they might with our rough roads and materials so imperfect as they then were. Somewhat so it may be, and indeed ought to be, in wheel materials: the interval between east iron and solid steel, now occupied by foreign builders with wronght iron, should be entirely passed over by us, and steel should be intro-duced, improved and trusted in as in every way a more desira-ble, cheaper and a safer material.

Erecting Locomotive Guide-Bars.

To the Editor of the Rahlhoad Gazette:
Your correspondent "Practice" objects to my "Directions

for Erecting Locomotive Guide-bars," and says that there is no builder that he is aware of but assembles the parts in the erecting shop. The directions were in the first place for repair shops as well as for new engines in shops that have no assembling arrangement for guide-bars; and that there are such one of the proprietors of one of the very largest locomotivebuilding shops in the country informed me. I believe that there are vastly more bars erected without assembling devices than with them, because there are more old bars than new

My attention was called to the subject from the fact that a large proportion of such bars are not set as well as they should be. This I know to be a fact, and an inspection of the engines at the Centennial will prove it. Furthermore, a fine fit, that is to say such a fit as I was required to make them, cannot be made by any assembling process, and there would be but very little time saved by the operation. Let "Practice" try some such erected guide-bars with marking, as directed in my previous letter, and he will find that they do not fit. My remarks were made from an experience with very nearly one thousand guide-bars. A good deal of faulty work may be found upon many locomotives, and I know now where to put my hand on one that is placed for inspection and on which slips of paper can be placed between the return crank (for working the pump) and its seat upon the crank-pin, while a 3-cent piece is slipped in between the connecting-rod key and the key way. Another and adjacent engine has the piston rod cross-head keyed on askew, so that a thick card will easily pass between the guide-bars and guide-block at diagonally opposite corners, while at the opposite respective ends of the guide-block it fits the bars. Observation of this particular case directed my attention to the subject. I at first thought the bars were out of line, but a moment's reflection showed me that such could scarcely be the case, for the bars would in that case be too far out of true with the bore of the cylinder to ren der the supposition entertainable. I then examined other bars and found in many cases the top one not adjusted, hence my "Directions for Setting Locomotive Guide-bars," which will, if followed, leave good work—better in fact than is pos sible with assembling devices.

THE WRITER OF THE DIRECTIONS.

General Railroad News.

ELECTIONS AND APPOINTMENTS.

Grayville & Mattoon.—Mr. R. J. Lawrence is Chief Engineer. His office is at Olney, Ill.

Toledo, Peoria & Warsaw.—The following circular bears date Oct. 1:

"Mr. J. W. Palmer having resigned the position of Master Bridge-Builder, the office is hereby abolished.

"Mr. H. Bissell is hereby appointed Assistant Engineer, and will have supervision of the bridges, in connection with his other duties.

will have supervised to the duties.

"Mr. W. M. Smith having resigned his position as Car Accountant, W. S. Palm, Stationer, is hereby appointed Car Accountant in his place, and will hereafter fill both of above countant.

positions.
"C. B. Plantz having resigned his position as Assistant Train
Dispatcher, F. W. Dunn is hereby appointed in his place,
"The above appointments to take effect from this date,"

Peoria, Pekin & Jacksonville,—Mr. Charles Macabe is appointed General Passenger and Ticket Agent. Keithsburg & Eastern,—Mr. J. K. Hornish has been chose resident.

President.

Helena & Iron Mountain.—At the annual meeting recently the following directors were chosen: Wm. Bailey, W. E. Moore, Bart. Y. Turner, W. H. Howes, John J. Horner, D. W. Davis, T. M. Jacks, J. H. Burkholder, J. V. Westlake, Jas. M. Levarsque, H. P. Rodgers, J. D. Lownsberry. The boar elected T. M. Jacks, President; John J. Horner, Vice-President Samuel I. Clark, Secretary; John P. Moore, Treasurer.

Northern Provide.

Samuel I. Clark, Secretary; John P. Moore, Treasurer.

Northern Pacyle.—At the annual meeting in New York, Sept. 27, the following directors were chosen: Charles B. Wright, J. Frailey Smith, Joseph Dilworth, Richard L. Ashursi, Philadelphia; Johnston Livingston, George W. Cass, Alfred E. Tilton, New York; Benjamin P. Cheney, John M. Denison, Boston; George Stark, Nashus, N. H.; Frederick Billings, Woodstock, Vi.; Charlemagne Tower, Pottsville, Pa., Alexander Mitchell, Milwaukee, Wis. The board re-elected Charles B. Wright, President; George Stark, Vice-President; Samuel Wilkeson, Secretary; George E. Beebe, Treasurer; George Gray, General Counsel. About \$17,000,000 of stock was represented and voted.

Louisville, Paducah & Southwestern.—Mr. M. J. McAuliffe has been appointed Auditor, in the place of T. J. Fitzgerald, resigned.

Nebroaka.—Mr. C. D. Dorman has been chosen Secretary an Treasurer, in place of Charles D. Smith.

St. Louis, Iron Mountain & Southern.—Mr. E. A. Ford habeen appointed General Passenger Agent. He has for five years past held a similar position on the Missouri Pacific, and until recently, on the Atlantic & Pacific.

until recently, on the Atlantic & Pacific.

Lafayette. Bicomington & Mississippi.— The officers of the new company are as follows: President, C. R. Cummins, Pekin, III.; Vice-President, John Cheney, Blcomington, III.; Secretary and Treasurer, J. B. Cohers, Pekin, III.

Union Pacific.—The division superintendents on this line are now as follows: Eastern Division, P. J. Nichols, Omaha, Neb.; Mountain Division, W. P. Davis, Cheyenne, Wy. T.; Laramie Division, S. T. Shankland, Laramie, Wy. T.; Western Division, J. T. Clark, Evanston, Wy. T.

*Florida Central.—Under decree of the Florida courts Joseph H. Durkee is now in possession of this road as Master in Charge. He has appointed Charles Holmes General Superintendent and W. M. Davidson, General Freight and Ticket Agent. The officers of this road, until recently worked by

Agent. The omes are in Jacksonvine, Fig. Shelby.—The officers of this road, until recently worked by the Louisville, Cincinnati & Lexington, are: F. Neel, President; George Petry, Superintendent.

Buffalo & Jameslovn.—In the foreclosure suit recently begun the New York Supreme Court has appointed Mr. James N. Scatcherd Receiver. Mr. 18catcherd is President of the com-

PERSONAL.

—Major W. W. Vass, Treasurer of the Raleigh & Gaston Company for 30 years past, is seriously ill at his residence in Raleigh, N. C. He is suffering from typhoid fever.

—Hon. Joseph Warren, editor of the Buffalo Courier and one of the chief projectors and promoters of the Buffalo, New York & Philadelphia Railroad, died Sept. 30.

—Thomas S. Hall, the inventor of the Hall railway signals, met with a very painful accident at his residence at West Meriden, on Sept. 26. Mr. Hall has been an invalid for the past year, and had recovered sufficiently to walk with crutches. On Tuesday evening he made a misstep and fell, fracturing his leg in several places above the ankle.

in several places above the ankle.

—Mr. Watts Cooke, Sr., father of Messrs. John and James Cooke, of the Danforth Locomotive Works, and Mr. Watts Cooke, Jr., of the Passaic Rolling Mill, died suddenly in Paterson, N. J., Oct. 1, aged 84 years. Mr. Cooke was formerly a pattern-maker and had resided in Paterson for many years.

—Gen. Braxton T. Bragg, Chief Engineer of the Gulf, Colora—do & Santa Fe Railroad, died suddenly in Galveston, Tex., Sept. 27. He was 61 years old, was a graduate of West Point, and was known chiefly for his services in the United States army before and the Confederate army during the war. He died from disease of the heart. His position on the Gulf, Colorado & Santa Fe was his only connection with railroads.

-Mr. James C. Tison, Assistant General Ticket Agent of the antic & Gulf Railroad, died of yellow fever in Savannah,

-Major E. M. For the Philadelphia, Vhis position Oct. 1.
-Mr. W. P. Va M. Fuller, for eight years past Chief Engineer of phia, Wilmington & Baltimore Railroad, resigned

Mr. W. P. Van Deursen has retired from his position as tor of the International & Great Northern road.

TRAFFIC AND EARNINGS.

Railroad Earnings.

у	Earnings for various	s periods	are reported	l as fol	lows:	
n-	Year ending June 30:	1875-76.	1874-75.	Inc	on Thee	90 .
y	Northern Pacific	\$739,746 449,719	1014-10.	IIIO.	or Dec.	P. c.
y	Expenses		********		*******	****
10	Net earnings Earnings per mile.	\$290,027 1,333				0.00
10	Per cent. of exps	60.79	********			****
10	Nine months ending Seg	pt. 30:				
10	Chi., Milwaukee & St. Paul \$	r 081 000	AV 404 480	To a	0077 140	
t	Eight months ending A	5,861,000	\$5,605,558	inc	\$255,442	4.6
n-	zayns monus chasny A	1876.	1875.			
er e	Atchison, Topeka &			_		
h	Santa Fe	758,037	\$841,343 384,897	Inc	\$651,449 373,140	77.4 96.9
g	Net earnings	\$734,755	\$456,446	Inc	\$278,309	61.0
- 1	Per cent. of exps	60.78	45.75	Inc	5.03	11.0
- 1	Burlington, Cedar Rapids & Northern	740,484	818 642	Dec	78,208	9.6
=	Expenses	576,666	549,450	Inc	78,208 27,216	5.0
	Not earnings	\$163,768 77.89	\$269,192 67.12	Dec	\$105,424	39.2
-1	Per cent. of exps Louisville, Cincin-	77.89	67.12	Inc	10.77	16.0
	nati & Lexington	707,910 518,721	709,183	Dec	1,273	0.2
r.	Expenses	518,721		*****		
	Net earnings	\$189,189				
B	Per cent. of exps	78.26				F -1
or l	Month of July:					
"	Denver & Rio Gra'de, Main Line	\$30,114	\$29,884	Inc	\$130	0.5
nd	Expenses	18,537	22,268	Dec	3,731	16.7
is	Not earnings	\$11,577	\$7,716	Inc	\$3,861	50,0
3-	Per cent. of exps	61.56	74 23	Dec	12.67	17.1
B	Month of August:					
70	Atchison, Topeka & Santa Fe	\$248,138	\$152,215	Tno	\$95,923	63 0
in	Expenses	117,800	55,610	Inc		111.9
	Wet complete	\$130,338	\$96,605	Ine	\$33,733	34.9
	Per cent. of exps Burlington, Cedar	47.47	36.53	Inc	10.94	29.9
p-	Burlington, Cedar Rapids & Northern	77,951	112,759	Dec	94 909	30.9
en	Expenses	70,215	91,382	Dec	34,808 21,167	23.2
280	_	\$7,736				_
ly	Net earnings Per cent. of exps	90.02	\$21,377 81.01	Dec	\$13,641 9.01	63.7
E.	Louisville, Cincin-	100.004	09 999	Tno	10 700	18 6
V.	nati & Lexington Expenses	106,664 71,173	93,882 71,294	Inc Dec	12,782	0.5
rd	_	\$35,491	\$22,588		A10.000	57.1
ıt;	Net earnings Per cent. of exps	66.70	75.92	Inc Dec	\$12,903 9.22	12 1
	Toronto, Grey	04 004	07 710			
k, B.	Month of September :	24,984	27,718	Dec	2,734	9.9
L.	Chi., Milwaukee &					
w.	St. Paul	\$646,150	\$741,206	Dec	\$95,056	12.8
il-	Second week in Septem	ber:				
a.;	Denver & Rio Gra'de, Main Line	\$7,184	96 944	Inc	8940	8.0
ed	Denver & Rio Gra'de,		40,082	AMO	фоно	0.0
nt;	Trinidad Extension	2,656	********			**
8.8	Third Week in Septem	ber:				
	Atchison, Topeka & Santa Fe	\$70,563	\$45,152	Inc	\$25,441	56.5
ffe	Denver & Rio Gra'de,					
ld,	Main Line Denver & Rio Gra'de,	8,029	5,806	Inc	2,233	38.
nd	Trinidad Extension	2,917				
818	St. Louis, Iron Mt. & Southern	88,800	90,161	Dec	1,361	1.
8.6	Week ending Sept. 15:		,		2,000	
ve	Great Western, of					
id,	Canada	£17,666	£16,043	Inc	£1,623	10.
he	Week ending Sept. 16:		608.000	9	40.100	
ns,	Grand Trunk	£39,100	£37,000	Inc	£2,100	8.
l. ;	Lumber Movement		Chianna for	Tag	1 40 51-	mi a
	Receipts and shipn	foot:	Omeago 170	ut dath.	1 10 26	he. w

 Receipts and snipments at Chicago from San. 1 to St.

 have been, in square feet:
 1876.
 1876.
 Decrease.

 Receipts.
 762,171,663
 852,890,192
 90,718,529

 Shipments.
 389,608,584
 440,836,844
 51,228,260

Cotton Movement. For the period from Sept. 1 to Sept. 29 the receipts at the sea-board and the exports were, in bales:

| 1876. | 1875. | Increase
| Receipts | 221,952 | 186,766 | 35,196
| Exports | 50,734 | 28,663 | 22,071

The receipts for the month have been exceeded but once in six years and are 27 per cent. greater than the average.

Coal Movement.
Coal tonnages for the week ending Sept. 23 are reported as

	201101111	1876.	1875.	Inc. or	Dec	P.c.
1	Anthracite		544,718	Dec.	15,197	8,8
	Semi-bituminous, Broad Top		*******			
	" Clearfield	18,011	23,820	Dec	5,809	24.4
	" " Cumberland.		55,650	Dec 4		74.0
l	Bituminous, Barclay	6,857	7,995	Dec	1,138	14.5
l	" Allegheny Region		00.601	Des	163	0.4
	" Pittsburgh Region	. 34,854	38,691	Dec	200	-

Shipments of Cumberland coal were prevented by breaks in the Baltimore & Ohio road and the Chesapeake & Ohio Canal caused by the storm of Sept. 17.

The Lehigh & Wilkesbarre Coal Company resumed work at all its colleries Oct. 2, with a full force and on full time.

The anthracite tonnage of the Belvidere Division, Pennsylvania Bailroad, for the week ending Sept. 23 was: 1876, 26,730; 1875, 32,454; decrease, 5,724 tons, or 17.6 per cent. Of the tonnage this year 22,797 tons were from the Lehigh, and 3,933 tons from the Wyoming Region.

At the Delaware & Hudson Canal Company's auction sale, Sept. 28, the following prices were obtained: Steamboat, per ton, \$3.12% to \$3.25; egg, \$3.27% to \$3.35; stove, \$4 to \$4.15. These prices are a slight advance upon those obtained at the Delaware, Lackawanna & Western Edward Canal Company's continued to \$3.00; stove, \$4 to \$4.15.

The coal tonnage of the Belvidere Division, Pennsylvania Railroad, for the nine months ending Sept. 30, was as follows:

1876. 1875. Inc. or Dec. P. c.
Coal Port for shipment. 194,506 113,130 Inc. 81,375 71.9
South Amboy for shipment. 321,622 171,686 Inc. 149,936 87.3
Local distribution on New Jersey lines. 116,855 147,332 Dec. 30,377 20.6
Company's use on New Jersey lines. 49,507 18,757 Inc. 30,750 163.6

Total 682,489 450,805 Inc. 231,684 51.4

Of the total in 1876, 478,747 tons were from the Lehigh, and 203,742 tons from the Wyoming Region. Actual shipments from Coal Port were 193,606 tons; from South Amboy, 349,393

4.6

9.6 5.0

0.2

4.9

36

7.1

2.8

5.0

56.2 38.3

1.5

10.1

5.7

. 27

en-P. c. 19.0 76.9

88 P.c. The business of the canal at Buffalo from the opening of nav-igation up to Oct. 1 is reported as follows:

Tolls received....... 2416,789 74 \$647,623 09 \$133,742 35 24.1

Number of boats cleared 3,454 4,466 1,012 22.7

The canal opened May 18 in 1875, and May 4 in 1876, so the average receipts for tolls per day were \$4,026 last year and but \$3,772 this year, a decrease of 31 per cent.

Grain Movement. the week ending Sept. 23 these receipts and shipments

The proportion of shipments by rail from lake ports was 44% per cent. in 1876, 37% in 1875, and 13% in 1874.

Chicago receipts and shipments for the week ending Sept. 30

	pts		2,415, 2,034	157 1,135,425	P. c. 47.0 13.7
Bal	timore grain receipt	ts for Sep	tember	were as follows:	
		1876.	1875.	Inc. or Dec.	P. c.

Wheat, bushels Corn Other grain	1,954,831	390,538 920,847 126,959		164,729 1,033,984 43,763	42.2 123.2 34.5
Total, bushels					70.8
For the nine months	enuing is	ерт. 30 г	ecerpus	were as	101-

Flour, barrels. 1876. 1875. Inc. or Dec. P. c Grain, bushels. 23,060,572 11,539,571 Inc. 11,521,001 99,6 Total, bushels.... 27,710,004 16,267,415 Inc.. 11,442,589 70,3 The increase is chiefly in corn.

The Baffalo Commercial Advertiser reports receipts at that city as follows for the nine months ending Sept. 30, flour in the should be supported by the control of the city as follows for the nine months ending Sept. 30, flour in the should be supported by the city of th

barrels and grain in bushe	18: our		ain —
By lake	1875. 684,395 469,400	1876. 31,394,386 10,411,100	1875. 35,863,867 6,253,000
Totals 1.377.351	1.153.795	41,805,486	42.116.867

The increase in flour was 19.4 per cent., and the decrease in grain 0.7 per cent. Of the flour 62.7 per cent., and of the grain 24.9 per cent. came by rail this year. The shipments eastward of grain for the same period were:

By rail, bushels	1876, 10,204,875	1875. 10,914,270 23,760,272	Decrease. 709,395 4.035,029	P.c. 6.5 17.0
By canal	19,120,210	20,100,212	4,000,020	-
Model .	00 000 110	94 674 549	4 744 494	19 7

Ocean Freights.

Ocean Freights.

New York rates have not varied much for some weeks. Last Tuesday quotations were: Grain by steam to Liverpool, 8½d.; by sail, 7½d.; flour by sail, 1s. 9d. per barrel; bacon by steam, 39s. per ton; cheese by steam per ton, 45s. to 50s. A steamer was chartered to take 48,000 bushels of grain to Liverpool at 8½d. To Cork for orders by sail grain was taken at 9d. Philadelphia quotations for grain are 8½d. per bushel by steam to Liverpool and 9½d. by sail to Cork for orders.

At Baltımore last week rates were 10d. per bushel for grain to Liverpool by steam; tobacco to Bremen 35 marks (\$8,75 cents) per hogshead for Maryland up to \$12.50 for Virginia; grain, by sail to Cork for orders, 9½d. to 10¾d.

THE SCRAP HEAP.

Railroad Manufactures.

Railroad Manufactures.

The Roane Iron Company, at Chattanooga, Tenn., now employs 585 men and its shops are full of work. In one week recently the rail mill turned out 605 tons of iron rails, being the largest week's work ever done in the mill.

The Danforth Locomotive Works, at Paterson, N. J., have some orders for bridge work and some machine work on hand, but are doing little locomotive work at present.

The Chattanooga Iron and Steel Company's Works are nearly completed and were to start up about Oct. 1. The mill building is 102 by 117 feet, is provided with an engine of 100 horse-power, besides several smaller ones, and will make bar and plate iron, rail fish-plates, etc.

The Rogers Locomotive Works, at Paterson, N. J., have an order for ten engines on hand and are quite busy at present.

The York (Pa.) Car Works are at work on a large order for freight cars for the Texas & Pacific road.

The Grant Locomotive Works, at Paterson, N. J., have about completed their order for ten consolidation engines for the Lehigh Valley road, and very few men are now employed.

Utilizing Coal Dust.

high Valley road, and very few men are now employed.

Utilizing Goal Dust.

The Pottaville (Pa.) Miners' Journal says:

"We alluded, a few days since, to the shipment from Carbondale by the Delaware & Hudson Canal Company, of 250 tons of coal dust daily to a New York firm for consumption at tide water. We have since learned that these shipments have been going on from Honesdale ever since navigation opened, some fifteen thousand tons having been shipped from that point, and the available supply there exhausted. The culm goes principally to the Ambracite Fuel Company, whose works occupy the old shipping docks of the Pennsylvania Coal Company at Port Ewen, just below the mouth of Rondout Creek. The culm is here transformed into a fine locomotive steaming coal, and has

been for some months in extensive use by several of the New York railroads. The Delaware & Hudson Company is itself using large quantities of this fuel on its northern railroads, part of which it manufactures by it own machinery at Bondout, and part of which is furnished by the Anthracite Company. The product is the same, as was that so successfully tried for the first time in the history of the industry in this country on the Reading Bailroad between Port Richmond and Pottsville, July 31, 1875, with engine No. 353, Franklin Obold, engineer, with 125 cars, laden with 700 tons of coal. The regular schedule time on that occasion was beaten nearly two hours."

A Greenhorn's Experience on a Locomotive.

The following letter was received at the Railroad Gazette office in reply to an advertisement of the "Catechism of the Locomotive:"

office in reply to an advertisement of the Catestand Locomotive:

Sur: I was reading your advertisement, Greenville Democrat. Faith, it was a short [time] since that I jumped on a locomotive and thought to amuse messife. Some one after seeing, by pretending to be the engineer, teling me to throw back the Lever, wich I did. pon my soul I niver sloed hur she ran ouff in a sand Bank ten miles from the spot. fur the life me soule I pulled every lever to and fro, and faith I've never seen or hurd from hur since.

Would you Plase send me the price of youre Book.

Yours truly

OLD AND NEW ROADS.

Denver & Rio Grande.

The operations of the Main Line (120 miles) for July are stated as follows:

3	Freight Passengers Miscellaneous	\$15,077 14,960 75	75 81 00
1	Total earnings (\$251 per mile)	\$30,113	56

Eric.

A telegram from Milford, Pa., dated Sept. 28 says: "At the session of the Court of Common Pleas now sitting here Col. J. Augustus Page, counsel for several of the fifth-mortgage bondholders of the Eric Railway, to-day moved that rule be entered amending the record and for judgment on failure to answer. This was opposed by Wm. Jessup, counsel for the Eric road, and Judge Waller decided that Mr. Page shall give ten days notice to defendant. It is understood that this is the first step of a coalition of American capitalists toward getting possession of the Eric railroad at the foreclosure sale under the fifthmortgage bonds."

Delaware, Lackawanna & Wastern

Delaware, Lackawanna & Western.

At the last regular monthly meeting of the board of directors it was decided to pass the quarterly dividend usually declared in October. It was stated that during the first eight months of the year the road had earned enough to pay all interest and rentals and a surplus for stockholders, but not sufficient to warrant the usual dividend.

Lafayette, Bloomington & Mississippi.

The bondholders, who have purchased this road at foreclosure sale, have organized a new company under the same
name, and filed articles of incorporation in Illinois. The
capital stock is \$400,000. It is said that the new company has
agreed to lease the road to the Lafayette, Muncie & Bloomington Company, as noted elsewhere.

ton Company, as noted elsewhere.

New York & Oswego Midland.

The final decree of foreclosure and sale was entered in the United States Circuit Court in New York, Oct. 3. The decree, as already noted, provides for the sale of the property at Middletown, N. Y., the date to be fixed hereafter, and provides that the purchaser shall pay \$100,000 cash at the time of sale. Should no bid amounting to \$2,500,000 be received, the sale is to be adjourned from day to day until further order of the Court. The decree fixes the total indebtedness at \$9,976,023.

Court. The decree fixes the total indebtedness at \$9,976,023.

Davenport & Northwestern.

An attempt was made last week to stop the work on the extension of this road into Davenport, Ia., by the Sheriff of Scott County, who sought to enforce an old mechanics' lion which had been placed in his hands. The Receiver, however, refused to recognize his authority, claiming to act under orders of the United States Court, and that court subsequently ordered the Sheriff to appear and show cause why he should not be proceeded against for contempt.

There is talk of an extension of the Maquoketa Branch from Maquoketa, Ia., northwest to Cascade, about 25 miles, provided sufficient aid can be secured along the line.

European & North American.

European & North American.

The road from Bangor, Me., to Vanceboro was formally transferred, Oct. 2, to the Receivers recently appointed on petition of the trustees under the second mortgage by B. E. Smith, Trustee under the consolidated mortgage, who has had n some time.

Portland & Rochester.

This company failed to pay the semi-annual coupon due Oct. 1 on \$350,000 first-mortgage bonds. The default is not altogether mexpected. A statement was to be presented at the annual meeting, Oct. 4. The company, we believe, has always paid the interest on its own bonds, although it has not for some time provided for the Portland city bonds issued in and of the road.

Ohesapeake & Ohio.

The Receiver has ordered a general reduction of 10 per cent. in all salaries and wages, on account of the depression in business and the low rates now prevailing.

Buffalo & Jamestown.

Buffalo & Jamestown.

In the New York Supreme Court at Buffalo the Farmers' Loan & Trust Company, of New York, as trustee under a first mortage executed in 1878, has begun suit to foreclose that mort gage. The complaint sets forth that the coupons due April 1, 1876, have not been paid and that a majority of the bondholders have requested the trustee to take action. It also claims that the company is insolvent and unable to pay and asks for a decree of foreclosure and sale.

The mortgage was for \$2,500,000, but the complaint in this suit puts the amount of bonds issued by the trustee at \$1,551,000, besides \$79,000 more believed to have been issued but not certified by the trustee, making \$1,630,000 in all. The amount outstanding by the last annual report of the company (Sept. 30, 1875) was \$1,100,000. At the same time the capital stock subscribed was \$1,509,700; paid in, \$1,165,90, and there was a floating debt of \$154,227. The road is 66½ miles long, from Buffalo, N. Y., southward to Jamestown, and was not completed until last year. Of the stock \$1,000,000 is held by the city of Buffalo and nearly all the rest by towns on the line, only a very small amount having been subscribed by individuals.

A special meeting of the stockholders was held recently, when 1249,697 passengers were transported to and from Philadelphia without the slightest secident or even an analyment to and the same time the capital stock were made lately to Samuel Carpenter, the Goneral Rastern amonying delay. The following figures are from reports which sat week, when 249,697 passengers were transported to and from Philadelphia without the slightest secident or even an analyment which we shill also the same time the company in provent provent held and that a majority of the bondholders have requested the trustee to take action. It also claims that the company is proved by the rustee to take action. It also claims that the company is insolvent and unable to pay and asks for a decree of from Pennsylvania Raitrou Philadelphia without the slight

all the stock to relieve the company from its pressing embarrassments. Nothing could be done, however, as the municipal
corporations holding nearly all the stock could not pay such an
assessment without special authority from the Legislature.

The Court subsequently appointed Mr. James N. Scatcherd,
President of the Company, Receiver.

Atlantic, Mississippi & Ohio.

Our Amsterdam correspondent writes as follows: "On call of
Messrs. Ziegelaar and Luessen, on Sept. 18, a meeting was held
of holders of the consolidated bonds of the Atlantic, Mississippi
& Ohio. Though about \$3,000,000 are in the hands of our
countrymen, only \$565,000 were represented, by 26 holders.
The meeting was very stormy, Mr. Luessen accusing one of the
protracted discussion a committee was appointed, consisting of
Messrs. Pick, de Morer, Oyens, Van der Waarden, Groedkoop
and Carp. The Board of the Stock Exchange added to these five
Mr. Van Vosterwijk Bruijn as chairman. The committee will
probably act with that of the English bondholders."

Mr. Van Vosterwijk Bruijn as chairman. The committee will probably act with that of the English bondholders."

Union Pacific.

The Commercial and Financial Chronicle quotes as follows from a letter addressed to the Money Market Review in London, over the signature of "Omaha," says:

"The President of the Union Pacific Railroad has written a letter in which he says: 'I regret as much as you do the present condition of the Omaha bridge bonds. I have been in Washington trying to prevent them abolishing the tolls, As long as we can collect the tolls, the interest will be paid and he bonds redeemed for the sinking fund. The mortgage could only be made a first mortgage by the consent of the first mortgage bondholders.' In answer to this, the President was applied to, to promise payment of interest unreservedly, independent of the boll question; but he does not alter his position, making the payment of interest contingent on the company's ability to collect the tolls. This position was maintained by the company before the Supreme Court. Their counsel said, in effect: 'The revenues derived from the railroad belong to the first-mortgage bondholders, and, if there be a surplus, it belongs to the shareholders. We seek to pay the Omaha Bridge bondholders out of the tolls of the bridge. If we are prohibited from collecting these tolls, we cannot pay the bondholders, as all other funds belong to the first mortgages and to the shareholders."

Kansas City, Memphis & Mobile.

Kansas Oity, Memphis & Mobile.

The property of this company is to be sold at bankrupt sale in Kansas City, Mo., Dec. 1. The property consists chiefly of a partly graded road-bed and some right of way.

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Master Car Painters' Association.

At the annual convention in Philadelphia, Sept. 20, reports were presented on Priming and Preparations, by John H. Will, New York & Harlem; How to Paint a Car, Ready for the Varnish, by R. McKeon, Atlantic & Great Western; The Causes of Varnish Cracking, by J. W. Fleming, Lehigh Valley; Surfacing, by R. T. Beazley, Maine Central, and were freely discussed. The question relative to the comparative value of a car or coach painted with oil as compared with the durability of varnish, the old method, was discussed, the majority of the delegates being of the opinion that the varnish method was the most durable in the long run, and that oil has a tendency to decay the wood upon which it is placed. The matter was finally referred to a committee to experiment and report upon at the next annual meeting of the association. A committee was also appointed to prepare a paper on the best method of preparing and embelishing car-head linings. The Committee on Ornamentation, including Styles and Colors, was given another year to report. The convention agreed upon Albany, N. Y., as the place for the next meeting, to be held on the third Wednesday of September, 1877. The convention was well attended and much interest was staken in the proceedings.

was taken in the proceedings.

Lafayette, Muncie & Bloomington.

In the suit brought by the directors of the company, asking for the appointment of a receiver, and seeking to obtain possession of the Western Division, a final decree has been entered by consent of all parties. The decree annuls the lease to the Toledo, Wabash & Western, and orders the transfer of the road to the Lafayette, Muncie & Bloomington Company. The transfer will be made as soon as the necessary arrangements can be completed.

It is said that the bondholders who now own the Lafayette, Bloomington & Mississippi road, have arranged to lease it to the Lafayette, Muncie & Bloomington Company, and that trains will be run through from Muncie, Ind., to Bloomington, Ill., the length of the line being 203 miles, and its course east and west, with a bend to the southward, near Lafayette. Its castern connection at Muncie is with the Cleveland, Columbus, Clincinnat & Indianapolis.

Illinois Railroad Taxation.

Illinois Bailroad Taxation.

The assessed valuation, given last week by the various road has been finally adopted by the Illinois State Board of Equalization. In addition thereto ten companies are assessed by the board upon equalized value of capital stock, being excess of stock and debt over tangible property as follows:

stock and debt over sangible property, as tollows :	
Chicago & Alton	\$2,339,953
Chicago, Burlington & Quincy	4,404,761
Chicago, Milwaukee & St. Paul	124,900
Chicago, Rock Island & Pacific	1,141,270
Cincinnati, Lafayette & Chicago	77,424
Illinois & St. Louis Railroad and Coal Co	188,313
Indianapolis & St. Louis (lessee of St. Louis, Alton & Terre	
Haute)	518,714
Joliet & Northern Indiana	68,091
Ohio & Mississippi	646,927
St. Louis, Vandalia & Terre Haute	595,853

......\$10,105,217 Adding this to the property assessment gives the sum of \$44,229,794 as the total assessed value of the railroads of the

Pennsylvania.

The New York Tribune of Sept. 30, says: "The travel over the Pennsylvania Railroad reached its highest point during last week, when 249,697 passengers were transported to and from Philadelphia without the alightest accident or even an annoying delay. The following figures are from reports which were made lately to Samuel Carpenter, the General Eastern Passenger Agent, and represent the business solely of the New York Division of the Pennsylvania road:

Date.	General business.	To and from Centennial.
Sunday, Sept. 17	6,923	*****
Monday, Sept. 18		11.651
Tuesday, Sept. 19	20,123	17,794
Wednesday, bept. 20	25.142	19.049
Thursday, Sept. 21		19,056
Friday, Sept. 22		15,184
Saturday, Sept. 23	23,171	17,032
Total		90,706
Grand total		040 007

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2,000 arrived within two hours; and upon Sunday over 1,500 pieces were received. These are only specimen days, showing the enormous business done in this department at the New York en'i of the route. The agents in charge find it necessary to devote their whole time and attention to the work of producing order out of chaos, and are present night as well as day answering innumerable inquiries as to missing baggage, which, however, seems invariably to appear in safety at the last moment. Notwithstanding the enormous amount of baggage on the road and constantly arriving at the distributing points in New York, not a single piece of baggage is reported as lost finally, and the Transfer Company has not been obliged to pay for any. The agents say that they can handle even more than they have yet received, owing to their great facilities in transportation.

for any. The agents say that they can handle even more than they have yet received, owing to their great facilities in transportation.

"The system and efficiency in all departments for handling baggage which exist in New York do not seem to be equally thorough in Philadelphia, and great inconvenience in regard to baggage is experienced there by persons viniting the Exhibition. One of the principal causes of this trouble lies in the fact that hundreds and thousands of travelers, upon reaching that city, have not decided at what hotels or boarding-houses to remain, and leave their baggage at the depots until they have decided the question. Others, upon reaching the hotel they expect to remain at, find the house overflowing, and are compelled to change repeatedly the address given at the express office, causing an endless amount of fault-finding upon both sides. There is constantly an immense quantity of baggage piled up at the various depots, amounting to between 5,000 and 6,000 pieces. Whenever a trunk is to be found this enormous quantity of baggage has to be examined until it is produced, and it frequently happens that the check on the missing article has been broken off by the rough handling upon the road, causing still further delay. Such cases as these, with the amount of baggage constantly arriving, produces unavoidable delays. At the same time it is stated that there is not so good a system in Philadelphia as that in New York."

Oregon Pacific.

Oregon Pacific. A company by this name has filed articles of incorporation in Oregon, and proposes to build a railroad from Portland, Oregon, southwest through Oregon, Idaho and Utah to the Union Pacific at or near Ogden, Utah. The capital stock is fixed at

Princeton & St. Paul. Princeton & St. Faul.

It is proposed to build a railroad from Princeton, in Mille
Lacs County, Minn., to a connection with the St. Paul & Pacific
at a Point about 20 miles south of Princeton. A meeting in
aid of the project was held recently and a committee appointed
to see what could be done. It is said that the line would open
up an extensive hard-wood region.

Baltimore & Ohio.

The employes in the Cumberland (Md.) shops, who have been working only 32 hours per week since June, began to make 10 hours per day Oct. 2. There is to be, however, a reduction of wages. Some repairs are being made at the rolling mill of the company at Cumberland, which are nearly completed, and the mill was to start up this week. Wages are reduced there as well as at the shops.

well as at the shops.

Philadelphia & Reading.

The parties who have been holding up the stock of this company for some time past have at last given way, and the stock has dropped on the Philadelphia Stock Exchange from about 44 to 20 (for \$50 shares), the lowest price quoted being 19% on Oct. 3, after which it recovered to 24. There are a great many rumors as to the cause of this giving way, but none of them are more than rumors, and there is nothing certainly known about the matter.

Dividends. Dividends have been declared by the following companies: Cumberland Valley, 2½ per cent., quarterly. United New Jersey, 2½ per cent., quarterly, payable Oct.

United New Jersey, 27, per cent., semi-annual, on the preferred stock, payable Oct. 2.

Lowell & Lawrence (leased to Boston & Lowell), 3 per cent., semi-annual, payable Oct. 2.

Vermont & Massachusetts (leased to Fitchburg), 2½ per cent., semi-annual, payable Oct. 7.

Carolina Central.

It is said that work will soon be begun on the proposed branch from Lincolnton, N. C., northward to the Western North Carolina at Hickory. The distance is about 20 miles.

North Carolina at Hickory. The distance is about 20 miles. Burlington & Southwestern.

The last rail has been laid on the gap which has long existed in this road between Unionville, Mo., and Browning. The road was completed in 1873 to a point six miles south of Unionville and 136 from Burlington, and from Laclede, on the Hannibal & St. Joseph road, north to Browning, 23 miles, leaving 26 miles yet uninished. This 26 miles has just been ironed by the Receiver, under orders of the Court, the bondholders furnishing the amount needed. Trains were to begin this week to run through over the whole line from Burlington, Ia., to Laclede, Mo., 185 miles, and were to make through connections for St. Joseph and Kansas City. Not all of this 185 miles, however, belongs to the Burlington & Southwestern Company: 19 miles, from Burlington to Fort Madison, are leased from the Cheago, Burlington & Quincy, and 15 miles, from Bloomfield to Moulton, from the St. Louis, Kansas City & Northern. The new line thus opened from Burlington to Kansas City is 306 miles long. new line miles lo

Missouri, Kansas & Texas.

The Machinery Department makes the following report for the month of August:

Mileage of locomotives	62,668	116,86
" " CATS	304,537	1,772,22
Average cars per train	4.9	15.
Cost of locomotives per train mile	17.61 cts.	24,30 ct
" " " car "		1.59 "
Pounds of coal used per car mile	8.81	4.8
Total cost of Machinery Department	18,951 10	\$37,423 6
" per car per mile		2.11 ct
Cost of car repairs per mile	2.60 "	0.51
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The total locomotive mileage, including switching and work-train engines, was 219,132 miles. The cost of switching and work-train engines is charged one-third to passenger and two-thirds to freight. Air brake repairs were 1.2 per cent. of pas-enger engine repairs, the cost of Pullman car repairs was 12.6 per cent. of all passenger car repairs.

Texas & Pacific.

A new survey has been begun of the line from San Diego, Cal., to Fort Yuma.

Pacific, of Missouri.

Pacific, of Missouri.

The United States Circuit Court has approved the sale of this road, and it will be transferred to the purchasers soon. Nothing further has been made public as to the organization of the new company.

The decision of the Circuit Court as to the St. Louis County lien on the road, noted last week, was given on a demurrer, which was overruled. The concluding paragraphs of the decision are as follows:

"It is our judgment that the effect of the agreement of the company with the county specifically to appropriate its earn-

ings as provided by the second section of the act of 1865, is to create a lien or charge, statutable in its origin and equitable in its nature, on those earnings as they arise, which may be enforced by the county, so long as bonds which it loaned to the company remain unpaid. This was the view expressed by Mr. Leighton, the attorney of the company at the time, as shown by his letter of Jan. 10, 1865, and his opinion is unquestionably a sound exposition of the purpose and effect of the act.

"It is not necessary to go into the general bearing on the subject of equitable liens or charges, since the rights of the parties in the case before us essentially depend upon the construction of the act of 1865. But the accepted doctrine of courts of equity, as respect to equitable liens or charges, will be found, we think, to support the conclusion we have reached. The cases clearly establish this legal proposition: If a debtor by a concluded agreement with a creditor sets apart a specific amount of a specified fund in the hands, or to come into the hands, of another from a designated source, and directs such person to pay it to the creditor, which he assents to do, this is a specific appropriation binding upon the parties and upon all persons with notice, who subsequently claim an interest in the fund under the debtor.

"This proposition would sus an the right of the county in the present case.

"It is urged, however, that the mortgagees under the third mortgage had no notice of the rights of the county. But they are bound to notice the acts of the Legislature of 1865 and 1868—the one authorizes the lien or charge, and the other recites the facts that the county has made the loan, and that it was then unpaid. As the mortgagees are charged with notice of all that they contain.

"Demurrer overruled, with leave to answer."

Chicago & North Shore.

A company by this name has filed articles of incorporation in Illinois. The line to be built is from Chicago north to Wauke-gan, about 36 miles, and is intended chiefly for suburban busi-ness. The capital stock is to be \$250,000.

Dayton & Southeastern.

Dayton & Southeastern.

The track is now completed from Xenia, O., eastward to Jamestown, 11 miles, and a train has been put on to run between those points. The work of laying the track east of Jamestown is still actively in progress, and the grading from Xenia west to Dayton is advancing steadily.

Atchison, Topeka & Santa Fe. s of this road for August, on 711 miles worked.

1	were as follows:	
1	Freight earnings\$163,499	42
1	Passengers 76.870	18
١	Express, mail, etc 7,768	73
	Total earnings (\$349 per mile)	-
1	Total earnings (2019 per mile)	385
ı	Operating expenses (47.47 per cent.)	51

Jersey Oity & Albany.

Trains on this road have been withdrawn for the winter, and, with the exception of an occasional coal train, will not run again until spring. The road is 12 miles long, from Ridgefield Park, N. J., to Tappantown. The traffic is very light and can only be made to pay running expenses during the summer. Louisville, Cincinnati & Lexington.

The Auditor, Mr. Wm. Mahl, reports for August as follows:

Passenger Freight Express, mail, etc	1876. \$48,224 43 52,130 34 6,309 23	1875. \$43,373 77 43,985 47 6,522 30	1874. \$42,111 95 48,706 88 5,136 32	1873. \$42,621 35 49,850 86 5,718 29
Total earnings Working expenses Renewal of ties and	3106,664 00 63,347 34	\$93,881 54 62,440 27	\$95,955 15 74,424 47	\$98,190 50 75,214 35
raila	7,825 92	8,863 30	1,336 02	4,166 92
Total expenses	\$71,173 26	\$71,293 57	\$75,760 49	\$79,381 27
Net earnings	\$35,490 74 1,290 00	\$22,587 97 1,451 25	\$20,194 66 1,451 25	\$18,809 23
toom	3,155 81	5,671 20	5,666 54	*******
Total	\$4,445 81	\$7,122 45	\$7,117 79	
Net profit	\$31,044 93	\$15,465 52	\$13,076 87	*********

Shelby.

Under the decree of the Kentucky courts setting aside the sale and transfer of this road to the Louisville, Cincinnati & Lexington Company, the road is now operated separately, and under charge of its own officers. It is ils miles long, from Anchorage Junction, Ky., east to Shelbyville.

Florida Central.

Under the decree of the Florida Circuit Court separating this road from the Jacksonville, Pensacola & Mobile, this road is now in possession of Joseph H. Durkee, Master in Charge. He is, however, running trains in connection with the Jacksonville road. The Florida Central is 59 miles long, from Jacksonville, Fla., west to Lake City.

Joplin & Girard.

Work is progressing steadily on this road, which is to extend from Girard, Kan., on the Missouri River, Fort Scott & Gulfroad, eastward to Joplin, Mo., about 40 miles. It is intended to furnish an outlet to the great Joplin lead mines, and also to open up some coal deposits on the line. The road is completed and in operation for 10 miles from Girard, and the company expects to have the entire line open this year.

Toledo, Peoria & Warsaw.

Toledo, Peoria & Warsaw.

Hassler's Financial Report says: "The plan of readjustment proposes as follows: That the Toledo, Peoria & Warsaw Railway Company, I. Cancel the income bonds. 2. Obtain from holders of the first preferred stock a surrender of 25 per cent. of their stock in exchange for common stock. 3. Obtain from holders of second preferred stock a surrender of 75 per cent. of their stock in exchange for common stock. 4. Issue balance of authorized preferred \$1,300,000, and convert all preferred stock into one issue. 5. Issue funded coupon bonds, payable fifteen years from date, or before, interest at 7 per cent., half yearly, and secured by deposit of coupons with a trustee, and by an annual sinking fund of \$26,000, to be invested in these bonds at lowest price not above par, sinking fund to be cumulative. That bondholders and creditors, 1. First mortgage bonds, East and West Division, surrender each four past-due coupons, and coupons maturing December, 1876, and February, 1877, respectively, and accept for same, with interest adjusted, funded coupons at par. 2. The first mortgage Burlington Division

surrender seven coupons, from 1st December, 1878, to 1st December, 1876, inclusive, and accept in lieu thereof and interest, preferred stock at par. 3. Second mortgage, West Division, surrender eleven coupons, 2d. April, 1874, to 2d. April, 1879, inclusive, and accept in lieu thereof and interest, preferred stock at par. 4. Consolidated bondholders surrender eleven coupons, 1st November, 1873, to 1st November, 1876, inclusive, and accept preferred stock at par for the same, with interest. 5. Holders of preferred stock and of the East Division first mortgage bonds are alone entitled to vote, until a dividend has been paid upon the common stock, as fully appears by articles of consolidation."

Central, of New Jersey.

Oentral, of New Jersey.

In Newark, N. J., Sept. 29, application was made to the Chancellor of New Jersey to have this company declared insolvent and a receiver appointed; also for an injunction against the sale or issue of any bonds under the new \$5,000,000 mortgage. The petitioner was Mr. Oba H. Sanderson, of Jersey City, a stockholder, and the complaint alleged that the company had exceeded its chartered powers by endorsing the bonds and notes of the Lehigh & Wilkesbarre Coal Company; that the debt of the company has been greatly increased by engaging in enterprises foreign to the purposes of its incorparation, and that it has besides assumed large debts of other companies; that its revenues are not sufficient to meet its interest obligations; that it is unable to pay its debts and is in fact insolvent.

terest obligations; that it is unable to pay its debts and is in fact insolvent.

Argument on the petition was made by counsel for the petitioner and the company, the latter denying the insolvency of the company and urging the great injury to the many interests involved which must result from the granting of the petition. At the close of the arguments the Chancellor at once announced his decision, refusing to grant the petition on the ground that no sufficient proof had been presented to support the allegations or to show that the company had exceeded its corporate powers.

corporate powers.

Lafayette, Muncie & Bloomington.

A bill has been filed in the United States Circuit Court for the foreclosure of the first mortgage on the Western Division of this road, and the Court has appointed Ron. Jacob D. Cox Receiver. Mr. Cox is also Receiver of the Toledo, Wabash & Western. The Western Division, which has been in operation for several years, extends from Lafayette, Ind., west to the Illinois line, 37 miles, and has been worked since its completion by the Toledo, Wabash & Western. There are \$666,000 bonds outstanding under this mortgage, which does not cover the lately completed Eastern Division from Lafayette to Muncie.

Saving #Ill & Parshboro.

spring Hill & Parrsboro.

The work of laying the track on this road is soon to be begun. The grading was nearly all completed last year. The road will be about 25 miles long, from the Intercolonial at Spring Hill, N.S., sontheast to Parrsboro on the Basin of Minas. It is intended to serve a coal region of considerable extent.

Grayville & Mattoon.

Grayville & Mattoon.

Mr. R. J. Lawrence, Chief Engineer, writes as follows under date of Sept. 25: "The Grayville & Mattoon Railroad was resuscitated by virtue of a foreclosure and sale made under the decree of the United States District Courts for Southern Illinois and Indiana, and purchased by Robert Finan & Co., of Pittsburgh, on July 27, the sile being confirmed on Aug. 8. Since that time the firm have been engaged in constructing the Newton Division of 20 miles, and succeeded in completing the track over the same on Saturday evening last. On that evening an excursion train ran over the line. The tracklaying was commenced Sept. 4 and the 20 miles completed on the evening of the 23d. The balance of the work will be prosecuted with such vigor and force as will insure its completion by July 1, 1877."

1877."
The whole leugth of the line from Mattoon, Ill., southward to Grayville, on the Wabash River, is about 90 miles. The Newton Division we suppose to be the 20 miles from the Ohio & Mississippi at Olney northward to Newton.

Painesville & Southington.

A company by this name has filed articles of incorporation in Ohio and intends to build a narrow-gauge road from Painesville, O., south by east to Southington, 35 miles. The line is parallel and close to that of the Painesville & Youngstown. Gilman, Clinton & Springfield.

Gilman, Clinton & Springfield.

A correspondent writes as follows: "The Circuit Court of the United States for the Southern District of Illinois has approved the report of the special Master in Chancery on the accounts of the late Receiver, F. E. Hinckley, and has ordered the balance yet due by Mr. Hinckley, amounting to \$18,776.25, to be paid into Court on Oct. 10. This road, which was received by the trustees about a year ago in a very dilapidated condition, after nearly two years administration by the Receiver, is rapidly being put in good order by the present management." Southern Minnesota.

Holders of first-mortgage (pink) bonds are requested to present the coup us due April 1, 1873, and October, 1, 1876, at the Third National Bank, New York.

Denver & Rio Grande.

Denver & Rio Grande.

Mr. William Wagner, Auditor, writes as follows: "From and after Sept. 1 this road is working under contract to divide all competitive earnings for two years between the Kansas Pacific and the Atchison, Topeka & Sants Fe rallroads, in accordance with decision of referees, which will award the proportion each road will enjoy of the result. To the weekly returns of earnings, therefore, must be added the amount that may be awarded of Denver and La Junta traffic by said referees."

ed of Denver and La June Man.

Oumberland Valley.

At a meeting of the directors in Philadelphia last week the usual quarterly dividend of 2½ per cent. was declared. The board refused to hear an argument of the Attorney of the Harrisburg & Potomac Railroad pertaining to the connecting of the Cumberland Valley Railroad with the Harrisburg & Potomac, as the question had already been determined by them.

Keithsburg & Eastern.

Keithsburg & Lastern.

A new arrangement has been made by which it is expected that work will soon be resumed on this road. The contract for its construction is held by Leighton & Co., and Mr. Holsted has a sub-contract for the grading and ties. The contractors are now in treaty for the tron for the section from Keithsburg, III., east by south to Denny, about 15 miles.

Silver Spring, Ocala & Gulf.

Work is now in progress on this road, which is to run from Blue Spring, Fla., by Ocala to Silver Spring, about 12 miles. It is to be temporarily laid with wooden rails. Silver Spring is reached by the steamboats which ply on the Ocklawaha River.

Montgomery & Eufaula.

The Receiver, Mr. A. J. Lane, requests holders of first-mort-gage bonds to meet at the office of John McAnerny, No. 63 Broadway, New York, Oct. 10, at 2 p. m. It is important that all holders should be present or represented at the meeting. Naugatuck.

This company is in an unusually favorable financial position, as a recently published statement of President Bishop says that the entire bonded debt of the company has been called in, paid off and canceled. The entire capital account now consists

22,000,000 stock, of which \$1,918,400 are outstanding in the hands of stockholders, and the remaining \$31,600 are unissued and in the treasury of the company. There is no floating debt, the cash on hand being more than sufficient to pay off all outstanding bills and accounts. The road is 56½ miles long, from Stratford, Conn., to Winsted, the outstanding stock being at the rate of \$38,954 per mile, upon which the net earnings of the last fiscal year were sufficient to pay a dividend of over 11 per cent.

Bringfield & New London.

Under the new agreement between this company, the Connecticut Central and the Connecticut Valley, travel over this road was resumed Oct. 2. At the same time the operation of the through line between Springfield, Mass., and Saybrook, Conn., formed by the three roads, was also resumed.

Conn., formed by the three roads, was also resumed.

East Brookfield & Spencer.

The parties interested are said to be strongly in favor of this proposed line, which is to extend from East Brookfield, Mass., on the Boston & Albany road, northeast to Spencer, and it appears probable that the road will be built. The distance is about three miles, and on a preliminary survey the cost is estimated at \$75,000. The successful working of the North Brookfield Branch road, built last year, has encouraged the projectors of other local branches in the same section of Massachusetts, most of which are intended to serve manufacturing villages.

New Orleans, St. Louis & Chicago.

Notice is given that the coupons on New Orleans, Jackson & Great Northern second-mortgage bonds, which became due Oct. 1, will be bought at par by Kelley & Alexander, No. 70 William street, New York.

Nova Scotia, Nictaux & Atlantic Central.

Arrangements are almost completed for the commencement of work on this road, and a beginning will be made shortly at Nietaux, N. S., by the contractor, Col. John E. Gowan, of New York.

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York.

Southeastern, of Canada.

Work has been begun on the extension of 20 miles from Waterloo, P. Q., to Sorel. A considerable force has been put on the grading, which it is intended to complete so that the track can be laid early next spring.

Portland & Ogdensburg.

Three gangs of tracklayers and two ballast trains are now at work on the Vermont Division of this road between Johnson, Vt., and Swanton. Track is being laid from Johnson westward and from Sheldon in both directions. Most of the rails are on hand and more are being delivered daily, so that there will be no delay for want of tron.

Northeastern, of Georgia.

Mortheastern, of Georgia.

Trains are now running regularly between Athens, Ga., and the terminus of the road, which is at the crossing of the Atlanta & Richmond Air Line, 40 miles northward from Athens and 66 miles northeast from Atlanta. In the 40 miles from Athens the road rises about 700 feet. A new town has been laid out at this terminus which has been named Lula. It is on the edge of the Chattahoochee Valley and six miles from Sulphur Springs.

Railway Mail Service Compensation.

The Special Commission on Railway Mail Service, having concluded its sessions in Chicago, met in Cincinnati, Sept. 30, when testimony was received from a number of railroad officers, merchants and others. As to the benefits derived from the fast mails there seems to be a considerable difference of opinion, but a general desire was expressed for improved local service in Ohio and Kentucky.

the fast mails there seems to be a considerable difference of opinion, but a general desire was expressed for improved local service in Ohio and Kentucky.

Railroad Men and the Yellow Fever Sufferers.

There was a meeting of railroad men at Atlanta Sept. 26 at which the following resolutions were passed:

"Whereas, our sister cities on the coast are in the most dire distress and destitution from the seourge now upon them which is daily increasing in fatality and adding each hour to their want; And, whereas, we hold and believe that no class are more accessible to the appeal of the unfortunate than the fatarnity of railroad men;

"Therefore, be it resolved, That the chairman and secretaries of this meeting be authorized and requested to issue such a circular as will bring the terrible want of the coast cities to the attention of the profession throughout America to the end that they may contribute their mite to a fund to be known as a railroad fund, for the relief of the yellow-fever sufferers of the South."

The chairman and secretaries have embodied these resolutions in a circular to railroad men, to which they have added the following appeal:

"To the Railroad Men of America:

"No words that can add to the above resolution can convey anything like an adequate idea of the terrible securge which has prostrated some of the South Atlantic coast cities whose utter destitution the above appeal is intended to aid. If the railroad men of America would send a dollar each, or even less, they will create a fund which will stand for all time a noble monument to their profession. We inclose an envelope adversed to the "Merchants' Bank, Atlanta, Ga.," in which please make your remittance. The bank will hold the fund while to the check of Col. L. P. Grant, Superintendent of the Atlanta & West Point road, to be used where most needed. The receipts each day will be acknowledged through the daily press of Atlanta."

The Superintendent Mr. John Thompson, informs us that

omo Central.

The Superintendent, Mr. John Thompson, informs us that this company (late the Atlantic & Lake Erie) during the month of September extended its line 11 miles, from Bremen northward to Pleasantville, and is now laying track at the rate of three-quarters of a mile aday. It will continue tracklaying will it reaches Granville, 17 miles further north, which is 48 miles from the present southern terminus at Moxahala. From Bremen to New Lexington, 12 miles, the track of the Cincinnat & Muskingum Valley road is used.

Boohester & State Line.

The Cattaraugus Republican says that the contract for the completion of this road has been sublet to Van Duzer & Wood, and that work was actually begun at Leroy (where it is to cross the New York Central and the Erie) Sept. 25. It says that it will probably be completed to Warsaw, ahout 20 miles, this season.

Passenger Traffic at Philadelphia.

The Philadelphia Times of Sept. 30 says:

"The great rush of people to Philadelphia on Thursday levels the efficiency of our lines of transportation into bold relief. It may be said with confidence that no other railroads is the State could withstand such a fearful strain. Their capacity and their general management, marked as it has been by speed, accuracy and safety, constitute one of the crowning slories of the great Exhibition, commanding alike our own reide and the admiration of all visitors. In five days of last week the Pennsylvania Railroad carried 249,697 passenges between New York and Philadelphia. Great as these sures are, however, they were celipsed by the work of the

same company on its main stem in the twenty-four hours embracing Pennsylvania Day. There was hardly a mile of the track along which the whistle of the locamotive was not heard at least once in every ten minutes of those twenty-four hours. At some points the procession of trains and sections of trains was endless. They came and went ceaselessly, and apparently aimlessly, but always with prearranged precision, which followed every foot of their progress from station to station, from switch to switch. Passengers always found the advertised train and reached their destination on time; baggage passed through many hands to be delivered without unnecessary delay, and all without injury to person or property in the slightest degree. Like efficiency characterized the management of our quarter of a million of guests on their arrival. The wonder is not that the street cars and other vehicles could not carry them all to and from the Centennial grounds, but that they carried so many and that not one accident occurred. Where is another city that could do this work so well? The people of the world are brought to our doors, fed and lodged, and sent away again with scarcely an hour of discomfort. Philadelphia is entitled to the first premium for handling crowds."

Ohicago & Northwestern.

to the first premium for handling crowds."

Chicago & Northwestern.

On the 1st of October this company began to run trains through into La Crosse, using for this purpose the new section of road built from its line into La Crosse by the Green Bay & Minnesota Company. The Northwestern trains have never hitherto entered La Crosse, though passing within a few miles of it. The distance from Chicago to La Crosse is 277 miles by this route,—almost the same as by the Chicago, Milwaukee & St. Paul (280 miles). There are now two express trains daily reaching La Crosse by the new route, the night train with Pullman care leaving Chicago at 9:15 p. m. La Crosse is an important place of tiself, and a connection with it will give the Northwestern a chance to share in the traffic of the Southern Minnesota also.

Northwestern a chance to share in the traffic of the Southern Minnesota also.

Welland Canal Improvement.

The Buffalo Commercial says: "Our reports from the line of the Welland Canal indicate that fair progress is being made on the new cut from Thorold to Port Dalhousie. Some delay resulted from the strike in the early part of the season. But since a settlement was made, all the men have continued steadily at work. About 650 stone-cutters are now employed on the canal and at the quarries on Queenstown Heights. The stone comes out of the quarries in very rough, irregular shape, requiring the services of an unusual number of cutters to perform a given amount of work.

"The impression among those employed on the canal is that the stone-work will all be completed next summer. After this is done the ditch can soon be made for the water. Nearly all the earth-work, excavating and grading is finished and the coping. Campbell & Co., who hold the contract for section four, are well along with the heavy work at the Welland Railway crossing. The large swing-bridge on section seven is finished. The tunnel under section eleven is practically done. Lobt & Co., contractors for section welve, are now engaged on their tunnel. It will be finished in ample time. The other locks are n various stages of advancement. If the men can be kept at work without interruption the prospect is good that the entire canal will be ready for business by the time specified in the contracts."

Houston & Texas Central.

The contract for grading the extension of the Waco Branch from Waco. Tex., to Snake Creek in Hill County has been let to Joseph Brennan, of Corsicana, Tex., who is to have 10 miles completed by Nov. 1.

The company has made a considerable reduction in freights to and from Waco and points on the Waco Branch, the object being to prevent a diversion of the business of the country north of Waco, to Fort Worth and the Texas & Pacific.

Missouri, Kansas & Texas.

Missouri, Kansas & Texas. Surveys have been begun for the line which it is proposed to build from Sherman, Tex., to Mineola in the interest of this

Texas & Pacific.

The Governor of Texas has appointed Capt. H. L. W. Mc-Clung, an old engineer, to inspect the new sections of this road on behalf of the State. The inspection is now in progress.

Milwaukee, Lake Shore & Western.

Work is in progress on the extension of this road from Appleton, Wis., west by north to New London. The bridge at Appleton is completed and much of the grading is done. The company recently received 300 tons of rails and tracklaying will soon be begun.

Wisconsin Central.

Wisconsin Uentral.

Work is still actively in progress on the gap in the main line between Worcester, Wis., and Penokee. It is said that the intention is to complete the road to the Flambeau River, north of Worcester, and to lay 13 miles of track from Penokee south this fall, leaving a gap of eight miles to be finished in the

Chicago & Lake Huron.

The Receiver reports for August as follows:	
Receipts	
Net balance \$78	
Work is progressing steadily on the gap between Fli Mich., and Lansing. Track is being laid from Flint eastwa	nt,
Chicago & Pacific.	

An arrangement for pooling the east-bound passenger trafficut of Peoria, over the Toledo, Peoria & Warsaw, the Indianapolis, Cincinnati & Lafayette and the Indianapolis, Blooming ton & Western roads is reported to have gone into effect Oct. 1.

Harrisburg & Potomac.

The permanent location for the extension of this road as far as the Maryland line, on the way to a connection with the Western Maryland, was completed about two weeks ago. The engineers have been working between Mount Alto and the Western Maryland road for more than three months.

ANNUAL REPORTS.

Ohio & Mississippi.

The following figures are published by the Commercial and Financial Chronicle in advance of the annual meeting and before the publication of the full annual report. They cover the year ending June 30, 1876, as reported to the Ohio Railroad Commissioner. The road worked (and owned) during the year was as follows:

Miles.

Main Line, Cincinnati, O., west to East St. Louis, Ill.... Louisville Branch, North Vernon, Ind., south to Jefferso Springfield Division, Beardstown, Ill., southeast to Shaw

steel rails, being an increase of the year was as follows:

The work done during the year was as follows:

The work done during the year was as follows:

1875-76. 1874-75. Inc. or Dec. P.c.
1874-75. 42,390,046 Dec. 470,379 1.1

Tons through freight carried. 473,620 391,863 Inc. 81,817 20.9

Tons local freight car'd. 810,634 600,324 Inc. 210,310 35.0

Total expenses...... \$2,474,726 \$2,664,264 Dec..\$189,538 7.1
 Not earnings.
 \$007,300
 \$863,510
 Inc.
 \$43,706

 Gross earn, per mile.
 5,499
 7,554
 Dec.
 2,085

 Not earn, per mile.
 1,475
 1,849
 Dec.
 374

 Per cent. of exps.
 73.17
 75.52
 Dec.
 2,35
 5.1 27.2 20.2 3.1

The decrease in earnings per mile is due to the large addition of new road, the earnings of which are much lighter than those of the old line. In 1874-75 transfers, amounting to \$323,294.37, were included in both earnings and expenses.

The income account is as follows:

the expenditures having exceeded the income by that amount. Excluding new construction and real estate, the expenditures for interest, sinking fund, etc., were \$906,829, being \$477 less than the net earnings for the year.

The Philadeiphia Awards.

The following are the awards announced last week in "Croup XVIII.," Railway Plant, Rolling Steck, Engines. The judges for this group were: American—Col. Robert E. Ricker, Elizabeth, N. J.; Gen. T. A. Morris, Indianapolis, Ind.; Felician Slataper, Secretary, Pittsburgh, Pa. Foreign—Capt. Douglas Galton, R. E., President, Great Britain; Ernest Pontzen, Austria: E. Schaar, Relgium.

Catton, R. E., President, Great Britain; Erness Pontzen, Austria; E. Schaar, Belgium.

1. Brooks Locomotive Works, Dunkirk, N. Y., Locomotive and Tender.

2. Porter, Bell & Co., Pittaburgh, Pa., Locomotive Engine.

3. Burnham Parry, Williams & Co., Philadelphia, Pa., Locomotives.

motives.
4. Dickson Manufacturing Company, Scranton, Pa., Passenger and Mine Engines.
5. Philadelphia & Reading Railroad Company, Reading, Pa.,

Philadelphia & Reading Railroad Company, Reading, Pa., Locomotives.
 Rogers Locomotive and Machine Works, Paterson, N. J., Wood-burning Locomotives.
 Danforth Locomotive and Machine Company, Paterson, N. J., Locomotive and Plantation Engine.
 New York Central & Hudson River Railroad Company, New York, Postal Car.
 Pennsylvania Railroad Company, Altoona, Pa., United States Postal Car.
 Creamer & Co., New York City, Car Fittings, Trimmings, etc.

10. Creamer & Co., New York, Car Fittings, Frimmings, etc.
11. Baker, Smith & Co., New York, Railway Car Heater.
12. Post & Co., Cincinnati, O., Car Fittings, Trimmings, etc.
13. Pullman Palace Car Company, Chicago, Ill., Hotel, Parlor and Sleeping Car.
14. Jackson & Sharp Company, Wilmington, Del., Passenger, Boudoir and Library Cars.
15. Wason Manufacturing Company, Springfield, Mass., Passenger Car.
16. Westinghouse Air-Brake Company, Pittsburgh, Pa., Westinghouse Automatic Air Brake.

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Union Car-Spring Company, Connecticut, Car Springs.
 Hamilton Steeled-Wheel Company, Philadelphia, Pa.,

Chilled Car Wheels.

19. Davenport, Fairbain & Co., Eric, Pa., Chilled Cast-iron Wheels. els. Nichols, Pickering & Co., Philadelphia, Pa., Steel Springs.

21. McKee & Fuller, Catasauqua, Pa., Railroad and Mine
Car Wheels.

Car Wheels.

21. Moreols.

22. Washburn Car-Wheel Company, Hartford, Conn., Steel-tired Car Wheels.

23. Cayuta Wheel and Foundry Company, Waverly, N. Y., Chilled Wheels.

25. Barnum, Richardson & Co., Salisbury, Conn., Cast Chilled Car Wheels.

hilled Car Wheels.

26. Baltimore Car-Wheel Company, Baltimore, Md., Chilled ast-iron Wheels and Tires.

27. Culmer Spring Company, Pittsburgh, Pa., Spiral Springs.

27. A. French & Co., Pittsburgh, Pa., Railway Elliptic

27. A. Frence & Co., Philadelphia, Pa., Godley's Improved Spiral Springs.
29. N. & A. Middleton & Co., Philadelphia, Pa., Godley's Improved Spiral Springs.
30. Ramapo Wheel & Foundry Company, Ramapo, N. Y.,
Chilled Cast-Iron Wheels.
31. American Paper Car-Wheel Company, Hudson, N. Y.,
Wheels of Compressed Paper.
32. A. Whitney & Sons, Philadelphia, Pa., Chilled Cast-Iron
Wheels.

rheels. 33. Samuel Lewis Harrison, San Francisco, Cal., Railroad xle-independent Wheels. 34. Pennsylvania Steel Company, Philadelphia, Pa., Railway

Switches.
35. Wm. Wharton, Jr., Philadelphia, Pa., Bessemer Steel Grooved Railway Curves, etc.
36. Wharton Railway Switch Company, Philadelphia, Pa., Safety Switch with Unbroken Track.
37. Pennsylvania Railroad Company, Altoona, Pa., Railroad

Track.
38. John Stephenson Company, New York, Street Tramway Cars. 39. J. M. Jones & Co., West Troy, N. Y., Street Car for Two

Hor 40. J. G. Brill & Co., Philadelphia, Pa., Street Cars for Horses.
41. S. G. Reed, Boston, Mass., Apparatus for Heating Locomotive Tires.
42. Mason Machine Works, Taunton, Mass., Locomotive

Engine. 54. Toronto Car-Wheel Company, Car Wheels of Chilled

Iron.
55. McDougall & Co., Montreal, Canada, Car Wheels of Chilled Iron.
63. Romean Railway Signal Company, New York, Electric Iron.
OSSEGNI Railway Signal Company, New York, Electric on Brothers, France, Rive de Gier, Wheels forged by

43. Brunon Brothers, France, and de diet, wheels longed by Hydraulic Pressure.
44. Lucien Arbel, France, Rive de Gier, Forged Iron Wheels.
45. Carl Ekman, Sweden, Railway Wheels.
46. Surahammar's Works, Sweden, Axles and Springs.
47. Fagersta Iron and Steel Works, Sweden, Axles and Springs.

Springs.

48. A. de Mare, Ankarstum. Works, Sweden, Railway Crossing, Chilled Cast Iron.

49. Harold Apslund, Sweden, Locomotive Engine.

50. Glockner Brothers, Germany, Tschirnsdorf, Block for Car

49. Haroin Apsimo, Swadan, Inconducts against 50. Glockner Brothers, Germany, Tschirnsdorf, Block for Car Brakes.
51. Saxby & Farmer, Great Britain, London, Holborn, Railway Signals, Switches, Crossings, etc.
52. Brierly, Sons & Reynolds, Great Britain, London, Hyde Park, Railway Signals, Switches, etc.
53. Aveling & Porter, Great Britain, Traction Engine.
56. J. B. Fonder, Belgium, Lock for Railway Carriages.
57. Valere Mabille, Belgium, Wrought-iron Buffors with Volute Springs, Couplings, etc.
58. Frederick Krupp, Germany, Essen, Wheels, Axles, Rails, Springs, Frogs, etc.

ov. Frederick Krupp, Germany, Essen, Wheels, Axles, Rails, Springs, Frogs, etc.

59. Camozzi & Schlosser, Germany, Frankfort, Self-acting Instrument for Verifying the Gauge and Measuring the Relative Level of the Rails.

60. Paul Klunizinger, Austria, Vienna, Self-acting Couplings

Level of the Rails.
60. Paul Klunizinger, Austria, Vienna, Self-acting Couplings, Brakes and Buflers.
61. Emil Tilp, Austria, Vienna, Connection between Locomotive and Tender for Reducing Lateral Motion.
62. Abookoff Steel Foundry, Russia, St. Petersburg, Railway Wheels, Tires and Axles.
64. Sandviken Iron Works, Sweden, Railway Wheels and

65. Societe Anonyme des Ateliers, Belgium, Louvain, Car

Wheels.
66, Societe Anonyme des Laminoirs, Hainout, Wrought-iron
Railway Wheels.

We have not as yet received the foreign awards in this group. Some of the awards in Group I., "Minerals, Mining, Metallurgy and Machinery," are given below. The judges in this group were:

American—Alexander L. Holley, New York; Prof. T. Sterr Hunt, Boston; Professor J. M. Safford, Tennessee; S. B. Axtell, Santa Fe, New Mexico; John Fritz, Bethlehem, Pa.; Austin Savage, Boise City, Idaho; W. S. Keyes, Eureka, Nev.; Prof. Fred Prime, Jr., Secretary, Easton, Pa.; Matthew Addy, Cincinnati, Ohio; Prof. G. C. Broadhead, Pleasant Hill, Mo. Foreign—Isaac Lowthian Bell, M. P., President, Great Britain; Ernest F. Althaus, Germany; L. Simonin, France; F. Vallou, France; Richard Ackerman, Sweden; Archille Jottrand, Belgium; L. Nicholsky, Russia; Nicholas Jossa, Russia; Prof. Dr.

Th. Kjerulf, Norway; Don Daniel de Cortazar, Spain.

The following awards are those most likely to interest rail-

road men:

2. Cleveland Rolling Mill Company, Cleveland, Ohio, Bessemer Steel and Siemens-Martin Steel Rails, Forgings, etc.

3. Grand Tower Mining, Transportation and Manufacturing Company, Illinois, Pig Iron.

43. Anthracite Fuel Company, Rondout, N. Y., Compressed Coal.

47. Brass and Copper Company, Ansonia, Conn., Sheets of Brass and Copper, planished, nickel-plated, etc.

48. The Albany and Rensselaer Iron and Steel Company, Troy, N. Y., Bessemer Steel and Wrought Iron Rails, Bars, Forgings, Axles, Spikes, Nails and Horseshoes.

49. Bay State Iron Company, Masssachusetts, Boiler Plate made *om Siemens-Martin Metal.

50. B medict & Burnham Manufacturing Company, Waterbury, Conn., Copper, Brass, etc.

55. Hussey & Co., Pittsburgh, Pa., Copper, Brass, etc.

56. Hussey, Wells & Co., Pittsburgh, Pa., Crucible Steel Plates and Bars.

59. Ingersoll Rock Drill Company, New York, Rock Drill.

60. Jones & Laughlin, Pittsburgh, Pa., Cold Bolled Wrought Iron Shafting.

100 Shatting.
61. The Lackswanna Iron and Coal Company, Scranton, Pa.,
Bessemer Pig Iron and Wrought Iron Bars.
63. The Cambria Iron Company, Johnstown, Pa., Raw Materials for the Iron Manufacture and Iron Bessemer Steel Rails

76. Riverside Iron Works, Wheeling, West Va., Wrought

Iron.
78. Shelby Iron Company, Alabama, Pig Iron.
79. Woodstock Iron Company, Alabama, Iron Ores, Pig Iron for Car Wheels, and Spiegel.
80. The Barnum-Richardson Company, Lime Rock, Conn., Pig Iron for Car Wheels.
81. O W. Davis, Bangor, Me., Pig Iron.
83. Reese, Graff & Woods, Pittsburgh, Pa., Wrought Iron and Steel Bars, and Horseshoes.
84. Phosphor-Bronze Smelting Works, Philadelphia, Pa., Phosphor-Bronze.
85. Revere Copper Company, Boston, Mass., Copper, Brass, Bronze, Cannon, etc.

50. Hevers coppes company, Bronze, Camon, etc. 126. Glasgow, Port Washington Iron and Coal Company, Port Washington, O., Pig Iron. 127. Tuscarawas Coal and Iron Company, United States, Cleveland, O., Pig Metal, 132. J. E. Mitchell, Philadelphia, Pa., Grindstones and

132. J. E. Mitchell, Philadelphia, 24., Fixtures. 174. Prof. De Volson Wood, Stevens Institute, Hoboken, N. J., Rock Drills (of two sizes.) 177. Keystone Bridge Co., Pittsburgh, Pa., Iron for Bridges. 189. Amherst Stone Company, Cleveland, O., Grindstones. 190. George K. Tyson, Philadelphia, Pa., Phosphor-Bronze. 191. Pennsylvania Steel Company, Harrisburg, Pa., Objects 191. Pennsylvania Steel Company, Harrisburg, Pa., Objects of Steel, and Steel Ingots.
192. Diamond State Iron Company, Wilmington, Del., Iron Bolts, &c.

olts, &c. 193. Wilson, Walker & Co., Pittsburgh, Pa., Wrought Iron 206. P. H. & F. M. Roots, Connersville, Ind., Rotary Power

Blower.

214. Edgemoor Iron Company (William Sellers & Co.) Philadelphia, Pa., Rotary Puddling Furnace and Links for Bridges.

215. Cooper, Hewitt & Co., New York, N. Y., Wrought-Iron Beams, Bars, Chains and Wire.

216. Crocker Brothers & Co., Taunton, Mass., Copper,

Brass, Zione.

Brass, Zione.

219. Bridgewater Iron Company, Bridgewater, Mass., Brass and Copper, Tubes, Chill Rolls, Wrought Iron, Steel Forgings and Nails. Alls.

Horace A. Beale, Parkersburg, Pa., Wrought-Iron and Puddled Bars.

Adirondack Steel Works, Jersey City, N. J., Steel Ingots

221. Adir

221. Adirondack Steel Works, Jersey City, N. J., Steel Ingots and Forgings.
231. Valentines & Co., Bellefonte, Pa., Pig and Wrought Iron.
249. Pottstown Iron Company, Pottstown, Pa., Wrought-Iron Plates and Bars.
250. Philadelphia & Reading Railroad Company, Reading, Pa., Iron Rails and Rail Piles.
251. Singer, Nimick & Co., Pittsburgh, Pa., Martin and Crucible Steel Plates and Bars.
255. Henry Roberts, Newark, N. J., Steel Wire.
264. E. & G. Brodee, Birdsboro, Pa., Wrought Iron.
267. J. T. Ames, Springfield, Mass., Emery.
268. American Tube Works, Boston, Mass., Brass and Copper Tubes.

278. A. O'Neil, Ansonia, Conn., Planished Nickel, Brass, Copper, etc. 279. C. B. Parsons, St. Joe Mine, St. François County, Mc., mass of Galens.

per, etc.
279. C. B. Parsons, St. Joe Mine, St. François County, Mo.,
mass of Galena.
280. Passaic Rolling Mill Company, New Jersey, Rolled
Wrought Iron Beams and Shapes.
285. Chrome Steel Company, Brooklyn, N. Y., Test Steel, Soft
Steel and Combined Steel and Iron Plates.
292. B. F. Sturtevant, Boston, Mass., Sturtevant Fan and
Pressure Blower.

385. Catasauqua Iron Company, Catasauqua, Pa., Wrought-Iron Bars.
386. Bowen & Signer, Saranac, N. Y., Wrought-Iron Blooms,
Bars and Horse Nails.
388. Allentown Rolling Mill Company, Allentown, Pa.,
389. Pierce Well Excavator Company, Peru, La Salle County,
III., Well Excavator.
380. Potts Brothers, Pottstown, Pa., Boiler Plate.

293. H. Burden & Sons, Troy, N. Y., Wrought-Iron Bars and Horse-shoes. 294. Henry Disston & Son, Philadelphia, Pa., Cast-Steel In-gots, Blooms and Plates. 295. S. C. Forsaith & Co., Manchester, N. H., Abbe Bolt-forg-ing Machine.

Lobdell Car Wheel Company, Wilmington, Del., Rivet-

297. Lobdell Car Wheel Company, making Machine.
299. Plumb, Rardick & Barnerd, Buffalo, N. Y., Bolt-forging Machine.
302. Brown & Co., Wrought-Iron Boiler Plates and Bars.
303. Blake Crusher Company, New Haven, Conn., Machine for Crushing Ores, Stones, etc.
304. Union Iron Company, Buffalo, N. Y., Wrought-Iron Reasons.

Sanis.

305. Union Iron Mills, Pittsburgh, Pa., Relled Iron Shapes.

306. The Washburn & Moen Company, Worcester, Mass.,
on and Steel Wire.

307. Bridgewater Iron Company, Bridgewater, Mass., Copper

and Brass.
309. Waterbury Brass Company, Waterbury, Conn., Brass, German Silver. S10. Alan Wood & Co., Philadelphia, Pa., Planished Sheet

311. W. D. Wood & Co., Pittsburgh, Pa., Planished Sheet on. 312. William Wiler, Philadelphia, Pa., Brass. 314. Philadelphia Iron and Steel Company, Philadelphia, Pa.,

Rolled Iron Shapes.
315. Phillips, Nimick & Co., Pittsburgh, Pa., Wrought-Iron
Bars and Boiler Plates.
316. John Roach & Son, Chester, Pa., Iron Boiler Plates and

John Roach & Son, Unester, rs., 11011 Johnson, 11011 Johnson of Large Dimensions.
James Rowland & Co., Philadelphia, Pa., Wrought and 316. Forgin 317.

317. James Rowland & Co., Philadelphia, A. S., Steel Sheets and Bars.
218. Scoville Manufacturing Company, Waterbury, Conn.,
Brass, German Silver, &c.
319. Stewart & Co., Easton, Pa., Wire.
320. The Edgar Thomson Steel Company (limited), Pittsburgh, Pa., Bessemer Steel Ingots, Rails and Forgings.
321. Manhattan Brass Company, New York City, Brass, Copper Zinc. &c.

per, Zinc, &c.

322. The Midvale Steel Works, Pennsylvania, Tubes, Bars, Forgings and Castings of Crucible and Siemens-Martin Steel.

323. Miller, Metcalf & Perkins, Pittsburgh, Pa., Crucible Steel

For Tools.
325. The Nashua Iron Company, Nashua, N. H., Iron and Siemens-Martin Steel Forgings.
326. New Bedford Copper Company, New Bedford, Mass.

326. New Bedford Copper Company, New Beulord, Manney, Copper.

327. Otis Iron and Steel Company, Cleveland, Ohio, Siemens-Martin Steel Boiler Plate.

328. Park Bros. & Co., Pittsburgh, Pa., Crucible Steel Boiler Plate and Bars.

331. James Henderson, Pennsylvania, Malleable Iron.

332. Holmes, Booth & Hayden, Waterbury, Conn., Brass and German Silver.

333. Charles W. Hunt, New York City, Machinery for Unloading Vessels and Storing Cargoes.

335. Catasauqua Iron Company, Catasauqua, Pa., Wrought-Iron Bars.

LOCOMOTIVE RETURNS, JUNE, 1876.

Master Mechanics of all American railroads are invited to a

	BE	HE	Mileag	Ð,	No. Miles run to				Cost per Mile in Cents for						Av. c'at of		
Hame of Boad.	umber of miles op-	umber of Locomo-	Total	Average per En-	Ton of Coal	Cord of Wood	Pint of Oil	Average No. of freight cars hauled	Average cost pr freight car per mile, cents	Repairs	Fuel	Stores	Miscellaneous	and wipers	Total	Coal, per ton or bushel	mood per core
											-	-	-		-	8	-
lleghany Valley (River Division)*. " (Low Grade Division)*. " (Low Grade Division)*. " (Third & Fourth Div.). " (Mahoning Division) airo & Vincounes amdeu & Allantic heshire† lieve, Col., Cin. & Ind.(Col'bus Div.) " (Indianapolis Div.) " " (Cincinnati Div.). " " " (Cincinnati Div.). " " " (Cincinnati Div.). " " " (Low Laka & Wast. (Bloomsburg Div.).	139 120 228 197 83 157 67 86 138 207 130 199 41	82 48 55 11 13 31 58 64 28 70 6 27	202,941 120,049 113,626 23,782 24,842 55,462 166,156 223,015 77,473 149,441 16,785 70,620	2,501 2,066 2,162 1,911 1,789 2,865 3,486 2,767 2,135 2,798 2,616	48,30 48,30 46,50 62,15 47,53 47,42 39,21 54,97 46,24	72.79	25.14 20.44 20.34 27.31	16.50	0.958	4.46 3.88 3.18	4.56 4.56 4.56 3.53 1.08 4.17 4.35	0.54 0.51 0.54	0.74 0.48 1.08 1.37 1.31	5.95 6.19 6.34 5.45 6.41 6.10 5.49 5.78 7.14 6.26	16.58 15.59 14.86 14.57 8.62 10.40 13.56 15.11 17.36 16.67 12.88 7.63	2,02 2,02 2,02 2,02 1,86 8,00 1,75 1,75 1,75 1,85	3. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3
irle & Pittaburgh*. Lannibal & St. Joseph effersonville, Madison & Indianapolis* ansas Pacific, Main Linef. including all branchess insasa City, St. Jo. & Council Bluffs ake Shore & Micl. So. (Buff. Div.) \$\frac{1}{2}\$. if "(Erie Div.) \$\frac{1}{2}\$. if (Toledo Div.) \$\frac{1}{2}\$. if (Mich. So. Div.) \$\frac{1}{2}\$.	98 296 226 673 915 275	94	56,243 123,097 85 466 149,152 173,858 63,248 181,821 243,170 165,684 460,618	2,198 2,085 1,755 1,850 2,433 2,020 2,151 1,972	44.20 48.07 33.44 33.64 52.20 42.87	33.49 42.15 49.41	16 83 17.40 16.05 12.66 12.90 23.70	21.35 16.40	1.000	2.75 4.80 8.70 7.44 6.76 8.30 8.94 4.49 8.66	5.17 9.14 9.28 6.20 9.55 7.41	0.80 0.58 0.49 0.48 0.50 0.51 9.32 0.42	2.10	6.99 6.80 7.06 6.92 7.23 7.30 6.28 5.87 5.79	16.91 15.64 18.42 28.99 23.75 22.30 20.29 18.11 18.59 20.83	1.70 1.50 2.50 3.00 3.07 3.00 4.00 3.25 3.45 4.35	3 3 3 5 5 5 5
.eavenworth, Lawrence & Galveston ittle Rock & Fort Smith Iarquette, Houghton & Ontonagon Insouri, Kansas & Texasil iow York & Oswego Midaud Iorthern Central (Elmira & Canan. Div.)	204 88 786 323 147	18 25 53 46	24,986 18,986 39,391 195,751	1,388 1.576 3,693	895.00 41.19 85.27	02.00	85.70 17.48 21.25 12.98 20.00	14,50	1.460	7.40 1.34 3.08	6.80 3.02 15.21 6.36	0.20 0.54 0.60 0.38	0000	6.20 5.36 7.85 6.22	20.60 10.26 26.74 17.55	3,38 3,00 2,26	
eensylvania (New York Division) (Amboy Division) (Belvidere Division) (Philadelphia Division) (Middle Division) (Pittab'gh Div., EastEnd) (Pittab'Div., WastEnd)	130 154 103 191 183	131 46 38 197	320,557 81,244 66,675 523,435 330,652 153,926 310,855	2,447 1.766 1,756 2.657 3.149 2,053	39.95 59.46 48.76 32.33 34.65 24.80		11.17 15.77 11.93 13.66			13.20 6.90 5.30 3.50 7.40 10.50	7.60 9.30 5,20 4.80 6.60	1.20 0.90 1.20 0.90 0.70 1.00			25.80 15.40 15.89 9.60 12.90 17.10	0.16 0.16 0.16 0.056 0.056 0.056	5 5 5 5 3 3 3 3
"(Tyrone Division)". "(Weat PennsylvaniaDiv)". (Lewistown Division)". "(Bedford Division)". "(Palladelphia, Wilmington & Baltimore. Pitts., Ft. Wayne & Ohi. (East'n Div.)" "(Western Div.)"	107 104 18 57 371 280	30 21 2 4 79 154	64,353 48,948 4,269 9,988 171,999 412,299 336,513	2,145 2,093 2,135 2,497 2,177 2,678	25.91 44.40 56.42 32.43 57.29 43.66	00000	24 64 36.50 19.76 26.32 12.06 16.04 17.80	15.20		13.40 5.20 0.60 1.20 4.40 3.91 3.52	6.40 4.00 8.10 5.10	0.60 0.40 0.60 0.50 1.00	1.59	6.80	7,40 20,40 9,60 4,30 6,80 21,50 16,13 16,09	0.056 0.056 0.056 0.056	3 3 3 5 1
Pitts., Cin. & St. L., Little Mismi Div.)* " (" (Pittsb. & Col.) Div.)* t. Louis, I. M. & So. (Arkanasa Div.) t. Louis & Southeast'n (St. Louis Div.) (Nashville Div.) Noss Jersey V	325	38 32 27	94,330 65,600 55,485 38,593 53,468	2,482	48.60 45 90 35.00	37.30	12.80 20.90 18,30 14,90 3 26,18 7 19.61	15.86	1.030	2.78 4.10 4.90 4.52	5.46 5.57 2.80 3.00	0.76 0.55 0.30 0.40 0.49	3.32	7.06 6.91 6.40 7.40	22.09 15.91 13.60 15.70 8.64 19.54	1,30 1.03	20 20 2
Sis months ending June 30 : Dieve., Col., Cin. & Ind. (Columbus Div.) (Ind. Div.)	188 207 130	64	927,448 1175,530 472,149	15,990	45.00	57.8	35.05 1 26.44 26.09	0000		2.25 4.08	4.40 4.64 5.20	0.62	1.20	6.18	14.55 16.43 16.88	1.96	20.00

iel not estimated ritching and work train engines allowed 60 miles per day. ngineers', firemen's and wipers' wages not included in cost of engine